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Ruby Canyon/Black Ridge Integrated Resource Management Plan

Bureau of Land Management
Grand Junction Resource Area
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Grand Junction, CO 81506

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Ruby Canyon/Black Ridge Integrated Resource Management Plan

U.S. Department of The Interior
Bureau of Land Management
Grand Junction District
Grand Junction Resource Area

March, 1998

Approved by _____

Catherine Robertson
Area Manager, Grand Junction Resource Area

Ruby Canyon/Black Ridge

Integrated Resource Management Plan

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BACKGROUND AND INTRODUCTION

The purpose of this plan is to maintain ecosystem health, facilitate multiple use management, while meeting human needs in providing a diversity of benefit opportunities. The need for the plan is to promote biodiversity and sustainable ecosystems while meeting human needs for a variety of uses such as high quality recreation activities and grazing.

The Ruby Canyon-Black Ridge Ecosystem encompasses a wide variety of settings that provide a great diversity of benefits to users and inhabitants of the area. This statement is at the heart of why this plan was written. The users in this case include a wide variety of recreationalists and traditional users such as ranchers as well as wildlife and plant species. To understand the approach taken in this plan, one needs to understand the concept of "benefits" and how it is being used to manage the resources present in this ecosystem. This is a "benefits-based" integrated resource management plan that goes beyond the traditional approach of managing each component of the ecosystem separately. It recognizes that the components of the ecosystem are linked and that each one contributes benefits to humans and non-humans alike.

"Benefits Based Management" (BBM), as defined in this plan are: changes that are viewed to be advantageous or improvements in condition (gains) to individuals (psychological and physiological), to groups, to society, or even to another entity such as an endangered species; the prevention of worse conditions; and realization of desired and satisfying on-site psychological experiences. The management objectives outlined in Chapter 5 are prescriptions to deliver targeted benefits for the major components addressed in this plan -- the recreational experience, vegetation, soil, water, air, wildlife and the archaeologic, historic and paleontological resource. Under a BBM approach, management objectives are the desired outcomes and benefits that we hope to maintain or achieve for each component of the ecosystem.

Data on the Ruby Canyon-Black Ridge area benefit opportunities was gathered from several sources. Qualitative focus group interviews were completed with area user groups. Managers were interviewed to determine the benefits they believe the area provides. On-site visitors and community leaders were also administered surveys to help planning team members define linkages between benefits and the originating activities, settings, and experiences.

The planning area has been divided into three zones, 1) north of the river, 2) the Colorado River, and 3) south of the river. These zones were determined on the basis of a commonality of distinctive features and attractions, visitor use characteristics, and a resulting sense of homogeneity as logical management units (see map on page vi). In order to better define the recreational experience opportunities, several of these zones were further subdivided (see map on page ix).

The team which was assembled to develop a plan for the Ruby Canyon-Black Ridge ecosystem was called the "Ad-hoc Committee". It consisted of a wide variety of disciplines from the Colorado Division of Wildlife, the National Park Service, BLM, business owners, grazing permittees, outfitters and guides, mountain bikers, hikers, OHV users, environmental organizations, and many other concerned citizens. It is an officially sanctioned working group under the Northwest Resource Advisory Council. Ad-hoc Committee members and their affiliation are as follows.

Name	Affiliation/Interest
Brenda Sabo	Audubon Society
Yeulin Willett	River Front Commission
Hawk Greenway	Rancher
Warren Gore	Rancher
Bill Hamann	Colorado Mountain Club
Jann Ertle	Grand Junction Chamber of Commerce
Rick Corbin	Colorado Plateau Mountain Bike Trail Assoc.
Curt Lane	Colorado Plateau Mountain Bike Trail Assoc.
Jim Majors	Colorado Plateau Mountain Bike Trail Assoc.
Derek Firth	Motorcycle Trail Riders Assoc.
Tom Klienschnitz	River Outfitter
Debbie Kovalik	Grand Junctin Visitor & Convention Bureau
Davirt Blair	Aid. Senator Ben Nighthorse Campbell
Keith Fife	Mesa County Planning Department
Bill Schapley	Sierra Club, Uncompahgre Chapter
Danni Langdon	Interested Citizen
Jan McLean	Museum of Western Colorado
John Schneiger	City of Fruita
Helen Traylor	Audubon Society
John Schler	Department of Local Affairs
Steve Yamashita	Colorado Division of wildlife
Steve Hickman	National Park Service, Colorado National Mon.
Cathie Zarlingo	Resource Advisory Council

This interdisciplinary process and formulation of the plan began with the team's articulation of a common vision (see Chapter 3). From this vision, general management goals were developed, BBM objectives were defined and management actions were agreed upon. Special work group teams were also assembled to work on issues relating to recreation, river management and desired plant communities.

a

These team members are as follows:

Recreation Work Group

Name	Affiliation/Interest
Steve Djokic	Interested Citizen
Neal McKinstry	Horseback Riding
Travis Baier	River Outfitter & Guide
Bill Baird	Jet Boater/Big Game & Waterfowl Hunting
Rick Corbin	Colorado Plateau Mountain Bike Trail Assoc.
Bill Schapley	Sierra Club, Uncompahgre Chapter
Larry Bullard	Western Clope River Boat Assoc.
Loretta Chessmore	Interested Citizen, Loma
Lovell Sasser	Horseback Riding
Yeulin Willett	Colorado Plateau Mountain Bike Trail Assoc.
John Martin	Motorcycle Trail Riders Assoc.
Pete Atkinson	Kayaker
Mark Peterson	Western Slope River Boat Assoc.
Paul Kuckyt	Interested Citizen
Norm Mullen	Colorado Environmental Coalition
John Lynn	Interested Citizen, Glade Park
Penth Seppone	Interested Citizen
Mike O'Boyle	Hiking & Biking
Howard Scott	Interested Citizen
Ronda Bucchela	Biking & River Floating
Steve Garner	Interested Citizen

Ruby Canyon River Management Working Group

Name	Affiliation
Mark Peterson	Western Slope River Boat Assoc.
Tom Kleinschnitz	River Outfitter (Adventure Bound)
Jerry Nolan	W.A.T.E.R.
Pete Atkinson	River Outfitter (Whitewater West)
Bill Baird	Private User
Gary Hunt	Western Colorado Jet Ski Assoc.
Chris Foreman	Colorado State Parks
Steve Gibson	Private Landowner

Desired Plant Community Team

Name	Affiliation
Tom Kleinschnitz	Adventure Bound
Curt Lane	Mountain Biker
Neal McKinstry	Horseback Club
Jerry Nolan	W.A.T.E.R.
August Aubert	Rancher
Mike Lawson	Rancher
Dave Farny	Rancher
Daryl Iser	Bighorn Sheep Society
Richard Levad	Audubon Society
Bill Schapley	Sierra Club
Patrick Perrotti	Colorado National Monument
Paul Creeden	Colorado Division of Wildlife
Don Gore	Rancher
Stephen Greenway	Rancher
Warren Gore	Rancher
Wayne Pond	Rancher

It is envisioned that the Ad-hoc Committee and work teams will continue to assist managers in implementing the plan as well as assessing its overall success in achieving desired benefits. Monitoring and evaluation of management actions will be undertaken to determine their effectiveness at resolving certain issues. The effectiveness of management actions will determine if they will be continued, expanded, refined or abandoned. Plan refinement, through the identification of new issues, the identification of new technologies and information to resolve issues, would be an ongoing process by the Ad-hoc Committee and any interested public or agency representative.

The management plans that exist now will continue to guide specific areas and resources within the Ruby Canyon-Black Ridge area such as McDonald Creek Cultural Resource Area or the desert bighorn sheep. This plan will be used to help ensure the integration of management between all activities and eliminate contradictory management actions. Through the process of continual refinement, this plan could be continually amended as new issues arise and as new information is made available regarding the benefits based management system. Thus the Ruby Canyon-Black Ridge plan is expected to have an indefinite life span.

PLANNING AREA DESCRIPTION

DESCRIPTION OF MANAGEMENT ZONES

I. SOUTH OF THE RIVER

Located on the northwest flank of the Uncompahgre Plateau, this zone is characterized by a series of seven spectacular canyons separated by high mesas. The canyons reach depths of more than 800 feet and contain a variety of erosional features including arches, alcoves, and spires. Intermittent water courses drain these canyons. Some canyon floors have been eroded to expose Pre-Cambrian igneous and metamorphic rock which have created scenic water falls and pools. All canyons drain into the Colorado River. Elevations range from 4,300 feet at the river to a high point of 7,130 feet on Black Ridge.

The canyons display scattered pinyon-juniper woodlands in the broad open areas and grassy meadows and riparian vegetation (cottonwoods, willow, box elder) along the canyon bottoms. Pinyon-juniper woodlands and sagebrush parks are the dominant vegetation in the upland areas.

A major part of this zone is the 73,000-acre Black Ridge Canyons Wilderness Study Area (WSA) which has been recommended to Congress for wilderness designation. According to the Ruby Canyon-Black Ridge User Study, the most satisfying activities by sub-zone are: Rattlesnake Arches-Pollock Canyon - 1st, hiking/walking. 2nd, mountain biking. 3rd, sight seeing/driving for pleasure. The zone is bordered on the east by the Colorado National Monument which also has acreage under consideration for wilderness.

For purposes of the recreation user study, this zone was divided into two recreation sub-zones: Rattlesnake-Arches/Pollock Canyons and Mee, Knowles and Jones Canyons. See Map on page ix).

II. COLORADO RIVER

This zone extends from Snooks Bottom, one mile southwest of Fruita to the Colorado-Utah State Line (21 miles). It includes Horsethief and Ruby Canyon and is very scenic with its ruby red canyon walls and erosional features. The zone includes the river, its floodplain, and the hill and canyon walls visible by the river user. The river

in one location has exposed black, metamorphic rocks which it has sculpted and polished creating a major attraction. Sandy beaches characterize much of the shoreline.

Cottonwoods, willows and tamarisk are common along the shoreline. Cheatgrass has invaded the corridor. Pinyon and juniper grow scattered near the river and along the base of the cliffs.

The Colorado River has sufficient flow to support floatboating year round. Floatboats (rafts, canoes, kayaks) provide the easiest access to the spectacular canyons that drain into this river corridor. According to the Ruby Canyon-Black Ridge User Study, the most satisfying recreation activities for this zone are: 1st, rafting and 2nd canoeing/kayaking. The float trip is 25 miles long between the Loma Launch site and the Westwater, Utah takeout.

III. NORTH OF THE RIVER

This zone extends from the cliff line on the north side of the river to about two miles north of Interstate-70.

This zone on the northwest flank of the Uncompahgre Plateau has been eroded into broad valleys, sloping mesas, steep hills and sandstone canyons. This variety of topography is a rich recreation resource providing for many activities. The principle drainage is McDonald Creek (intermittent) which helped to form Rabbit Valley as well as a scenic sandstone canyon. The area is rich in a variety of vertebrate fossils and an active quarry is located along the Trail Through Time.

Vegetation ranges from grasses and desert shrubs in the lower elevations to pinyon-juniper woodlands along the slopes and in higher elevations. Riparian vegetation grows along lower McDonald Creek.

Challenging mountain bike, hiking, motorized and horseback riding trails occur in this zone. The Kokopelli Mountain Bike Trail crosses the entire length of this zone. Interstate-70 provides easy access to the area and a variety of recreation opportunities. According to the Ruby Canyon-Black Ridge Study, the most satisfying activities were (for the purpose of the recreation user study, the zone was divided into recreation sub-zones: Rabbit Valley/Trail Through Time and Lions and Mary's Loops):

Rabbit Valley/Trail Through Time - 1st, hiking/walking, 2nd, mountain biking, 3rd, viewing dinosaur fossils; and Lions and Mary's Loops - 1st, mountain biking, 2nd, horseback riding.

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Map 1. RUBY CANYON/BLACK RIDGE PLANNING AREA

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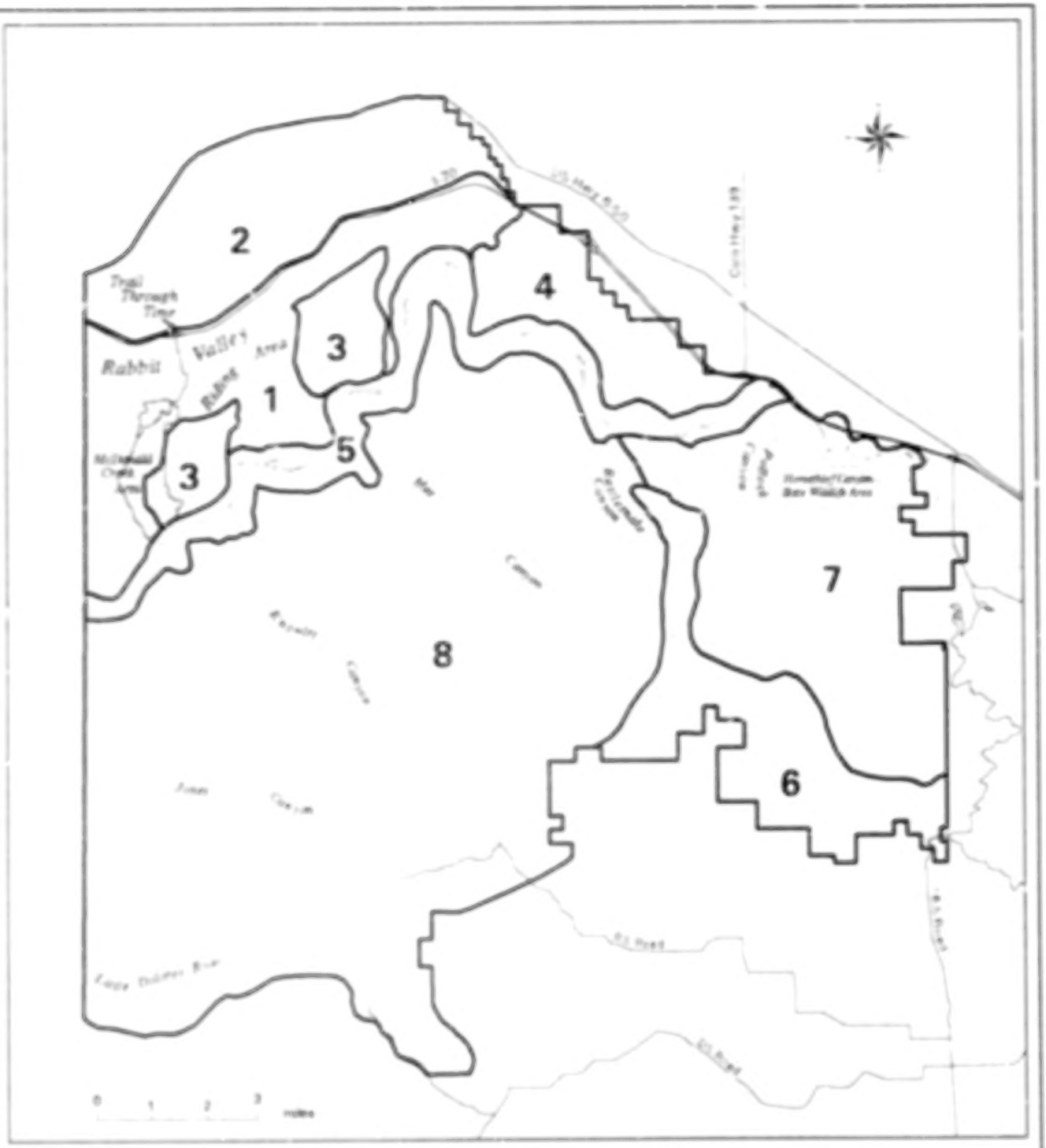

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Map 2. Recreation Management Zones

1 Rabbit Valley Riding Area

2 Trail Through Time

3 McDonald Creek, Wildhorse Mesa, Rabbits Ear Mesa

4 Mary's and Lion's Loop

5 Colorado River

6 Southern Perimeter and Arches

7 Pollock Canyon Complex

8 Black Ridge Canyons West

CHAPTER 1

Issues and Concerns

The Bureau of Land Management, cooperating with Northern Arizona University's (NAU School of Forestry), studied the Grand Junction Resource Area's Ruby Canyon and Black Ridge (RCBR) area during 1992 and 1993. The goals of the study were to 1) provide managers with baseline information on area visitors, 2) identify perceptions of various user groups regarding benefits derived from this area, and 3) identify perception of community leaders regarding benefits derived from this area. Three methods were used to obtain this information. First, an on-site visitor survey was conducted during 1992 and 1993 at various locations in the RCBR area; second, members of various users participated in focus groups to identify and discuss benefits of the RCBR area; and third, a sample of community leaders of Grand Junction were surveyed.

Community Interests and Concerns

Fifty community leaders from both the private and public sectors representing diverse interests were contacted and surveyed regarding how they felt the RCBR area contributed to Grand Junction and its residents. The survey found that community leaders felt the RCBR provides a variety of benefits for the Grand Junction community. The most important benefits they identified were: 1) maintaining an outdoor-oriented lifestyle, 2) a feeling Grand Junction is a special place to live, 3) the appeal of Grand Junction as a tourism attraction, 4) opportunities for exercise that can improve the health of the local people, 5) a greater understanding of the natural environment, and 6) a greater concern for the natural environment.

Some of the benefits provided by specific zones within the RCBR area include: Rabbit Valley and Mary's and Lions Loops are valued as recreation areas, Ruby Canyon, Colorado River and Canyons are valued as wilderness areas, and Rattlesnake Canyon and the Arches are valued as a tourist attraction.

Satisfaction with the BLM, its personnel and management of the RCBR is quite high among community leaders (average score of 5.88 on a scale of 1 to 7). The leaders felt there was room for improvement in caring for visitors and in the areas ability to handle an increase in tourism activity. Management suggestions given included: 1) increasing BLM's cooperation with other agencies and co mmunity groups, 2) improving education efforts directed towards visitors, 3) intensifying enforcement and management, and 4) increasing limits and controls on various user groups.

Issues Identification With All Partners

Issues, concerns and desired benefits from all other partners, visitors, and user groups were gathered from the visitor survey and focus groups interviews. User groups interviewed included the jeep users, archaeologists, the horse club, Sierra Club Audubon Society, river runners, motorcycle users, mountain bikers, and gem and mineral enthusiasts during focus group sessions. These groups were asked what individual benefits they realized while recreating in the RCBR area. They were also asked what they thought land managers could do better to help them realize these benefits.

The visitor survey provided additional information on user desires for certain recreation experiences and benefits as well as identifying problems and the desirability of a range of management actions.

Issues Relating To Archaeological-Historical-Paleontological Resources

Many archaeological, historical, and paleontological resources exist throughout the Ruby Canyon-Black Ridge area. The bulk of these resources have yet to be discovered and documented. An increasing resource database is needed for managing their preservation and appropriate uses for the benefit of the American public.

Numerous prehistorical and historical Native Americans once moved through and inhabited the area leaving behind evidence of their cultures. Ranching, mining, railroading, and other livelihoods produced remains indicative of the historical uses of the area. Many dinosaur and other fossils, found in the area's geologic formations, have of local to international importance based on their scientific, educational, and recreational values.

The protection and appropriate use of archaeological, historical, and paleontological resources in the area are important management issues. Concerns include consideration and protection of these resources in all management actions. This is best done through use of surveys, databases and sensitivity screening maps that display areas suspected of containing significant cultural and paleontological resources. Important resources should be removed from mineral entry and the BLM should continue working with partnerships and networking with the stakeholders to help educate the public about the protection and appropriate uses of these resources.

Preservation and protection are valid concepts in dealing with archaeological, historical, and paleontological resources for the public benefit. Scientifically-significant collections should be made by authorized permits, and BLM should encourage and facilitate research whenever possible. Researchers should provide a return to the American public, as legal and appropriate, about the results of such research and how it enriches our knowledge.

From much of this knowledge of located archaeological, historical and paleontological resources, opportunities for interpretation of these resources need to be further funded and made available. Educational and recreational uses of these resources need to be maintained in appropriate and sustainable ways for the public benefit.

Issues Relating to Vegetation, Soil, Water and Air, and Wildlife

Vegetation

The major issue concerning vegetation was to maintain or attain healthy vegetation communities that: enhance ecological processes, provide stable watersheds, ensure a rural environment, meet the needs of livestock and wildlife including threatened and endangered species, and provide an aesthetically pleasing environment. These cannot be provided on every acre of land but should be provided on an overall landscape basis. Along the Colorado River a big concern is to retain native plant communities which are threatened by the invasion of exotic plants and the loss of cottonwood galleries.

Soil, Water and Air

The main issue centered around properly functioning watersheds. If a watershed is in properly functioning condition it would provide for reduced soil erosion and protect water and air quality. The key to watershed condition will be how the vegetative communities are managed.

Wildlife

1 How can impacts of recreational use be minimized on rare plants, wildlife species (desert bighorn)?

2 How can the area be used to educate the public in the enjoyment of and concern for the ecology of arid environments?

3 How can the endangered species in Ruby Canyon be best protected?

4 How can the desert bighorn sheep be the key management species of wildlife south of the Colorado River?

5 What can be done to actively improve wildlife habitat in the area and perhaps get populations high enough to make hunting an attractive pursuit?

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Chapter 2

Area and Community Attractions and Services

I. Natural Resources

The Colorado River corridor from the Loma Boat Launch to the Utah state line is generally known as Ruby Canyon. This corridor is the heart of the 118,700 acre Ruby Canyon/Black Ridge ecosystem. It includes rolling, saltbush covered hills, pinyon-juniper and sagebrush-covered mesas, a 20 mile stretch of the Colorado River nominated by the BLM for National Scenic River designation, and over 70,000 acres of sheer-sided, red-rock canyons, natural arches, caves and alcoves.

A. Wildlife

The Ruby Canyon/Black Ridge ecosystem displays its health in the wide variety of wildlife who are still at home here. Some, like the desert bighorn sheep, peregrine falcon, humpback chub, razorback sucker, and squawfish have lost their hold in other places. But they still exist in Ruby Canyon. Others, like the Scott's Oriole, find suitable nesting habitat here at the very edge of their range. The abundance of other forms of wildlife reflects the rich mixture of habitats available (see map 3 page 2-3).

The BLM assisted the Colorado Division of Wildlife (CDOW) and the National Park Service in recovery programs for Desert Bighorn Sheep (see Appendix A) and peregrine falcons. In the three years of 1979, 1980, and 1981, the two agencies released 36 sheep into Monument and Devils Canyons. Collaring bighorns and annual monitoring show that today's bighorn population is around 75. This population has allowed for hunting mature rams since 1988. A total of 18 half-curl or better rams have been harvested.

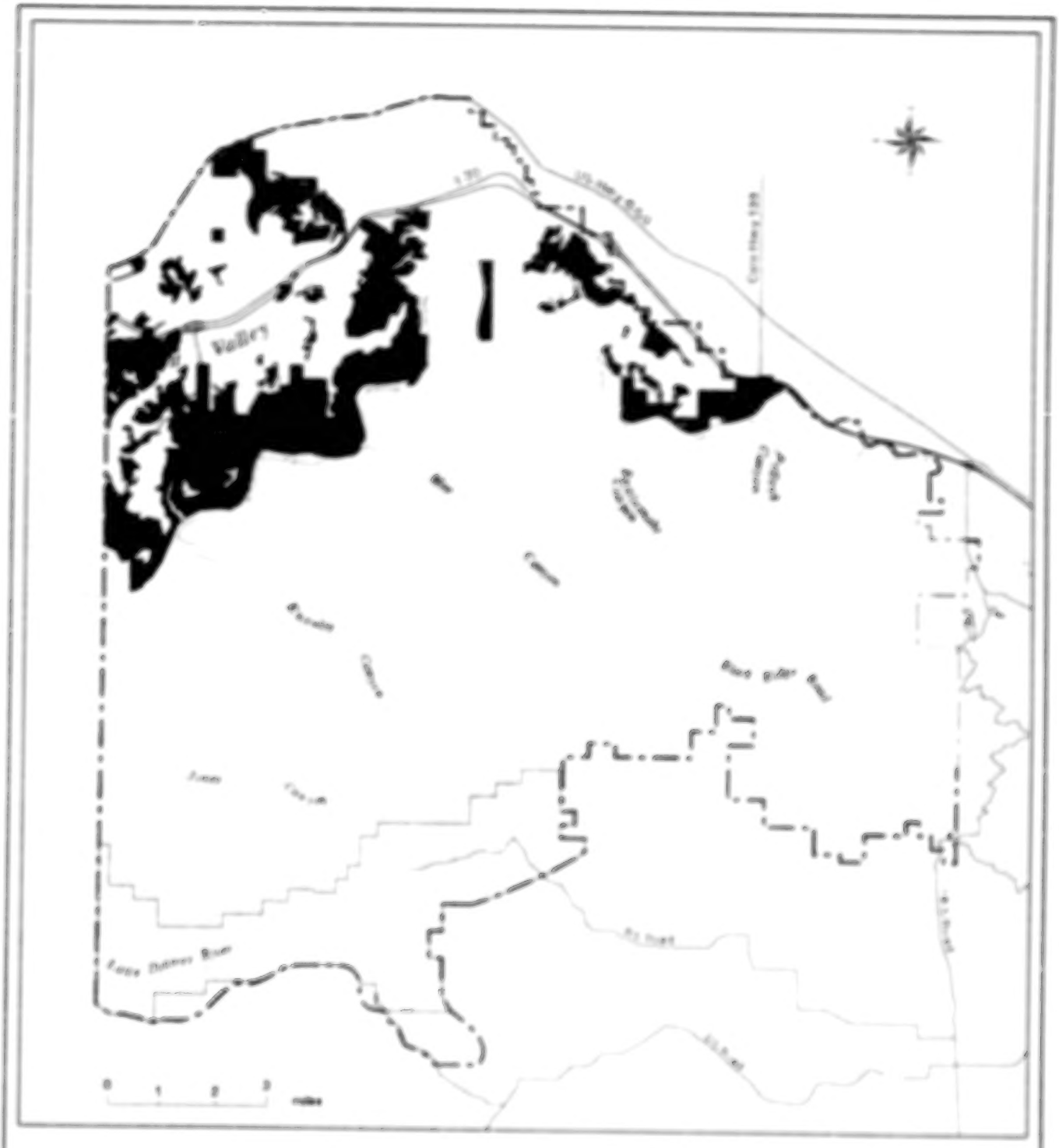
The BLM also participated with the CDOW in the Peregrine Recovery Project, bringing the population back from the brink of extinction. Reduced eggshell thicknesses in the years the pesticide DDT was used made it impossible for peregrines to successfully hatch their young. Scientists and volunteers removed the eggs, replaced them with plastic imitations, hatched the young, and then returned them to their nests. Today there are four nesting pairs of peregrines in the Ruby Canyon Corridor raising an average of almost two fledglings per nest each year. In the summer, volunteers and employees search the skies above the canyon rims to glimpse these swift birds, recording their locations and health. Any potentially disturbing activities near the eyries are prohibited during nesting season. BLM biologists believe the Ruby Canyon corridor would also provide excellent habitat for other sensitive species. Candidates for reintroduction are the black footed ferret, in Rabbit Valley.

From 10 to 20 bald eagles can be found in Horsethief and Ruby Canyons any day along the river between December 15 and March 15. One large night roost has been found and single and double occupancy type roosts have been observed along the river in Ruby Canyon. In the late 1970's a pair of bald eagles began staying the summers below Westwater Canyon in Utah. In 1988 the decade of effort by that couple paid off with a new pair of bald eagles nesting up river at Westwater next to the Colorado state line. Finally in Ruby Canyon a pair of bald eagles nested in the summer of 1995 and again in 1996 producing two fledglings each time.

An active peregrine eyrie was discovered in Ruby Canyon in June 1986 on the north side of the river. They fledged young in eight out of the past 10 years. In 1988 the pair adopted a cliff on the south side of the river. At the spacing of four miles between pairs there is room for three more pairs of peregrine falcons in the area. In 1991 a pair settled downstream and a second pair in 1995 downstream from them. In 1996 the first Ruby Canyon pair disappeared early, but a pair showed up with fledged young upstream.

The needs of the Colorado River System's endemic fishes seem to be accommodated at least marginally in this area between Loma Bend and Utah Line Railroad Siding. Black Rocks in Ruby Canyon is a deep channel stretch of the river vital to maintaining the humpback, and perhaps, bonytail chubs.

An endemic fish present in the Colorado River that is believed to be more endangered than the squawfish is the razorback sucker. The razorback sucker is listed an endangered species and like the others, the river through Ruby Canyon is listed as critical habitat for them.



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Map 3. Areas of Wildlife Concern

- Scott's Oriole and gray vireo habitat
- Deer critical winter range
- Desert Bighorn Sheep Occupied Range

Other species of special concern that do or may occur in the planning area include the kit fox (desert and sparse juniper), western yellow-billed cuckoo (cottonwood riparian), spotted bat (cliffs), the southern spotted owl (canyons as Mesa Verde and Canyonlands National Parks), canyon treefrog, night snake (McDonald Creek, north side of the river), and western yellow-bellied racer (north side of the river south of Mack).

The golden eagles are of special concern and protected by the Bald Eagle Act. Other raptors that have been found are turkey vulture, Coopers hawk (nest), red-tailed hawk, prairie falcon, American kestrel, great horned owl, long-eared owl, western screech owl. Three other birds species present that are at the periphery of their ranges, and as such considered sensitive are the Cassin's kingbird, gray vireo, and as mentioned above, the Scott's oriole.

No listed species of plant has been identified within the area. Neither has a plant association of special concern been delineated here. However, the sensitive plant Lomatium latilobum, occurs along Rattlesnake Canyon. Rare plants including Amsonia jonesii, and Cryptantha osterhoutii are both known to be north of the river and the latter also found south of the river.

B. Vegetation

The planning area consists of a wide variety of plant communities and vegetation types. In the lower elevations north of the Colorado River the salt desert plant community dominates with a scattering of pinyon-juniper mesa tops. Three varieties of salt bush and other various shrubs occupy this area along with a blend of forbs and grasses. This diverse community provides vital habitat for an antelope population. Most areas that have been disturbed in some way or another in the past contain a substantial composition of cheatgrass. Fire, livestock grazing and recreation are the major activities or disturbances that have influenced the plant communities north of the river.

Riparian vegetation characterizes the Colorado River Corridor. Cottonwood galleries located on the floodplain are interspersed along the river amongst the willow, skunkbush or tamarisk dominated stream banks. The non-native tamarisk is now a significant component of the riparian community and either co-dominates or completely dominates many stream banks. Changes in the hydrology of the river, mainly flow rates due to upstream dams and irrigation is thought to be the main reason for this invasion, not direct uses along the river. Escaped fire from recreation use has been a major factor in the decline of the cottonwood community and the increase in salt cedar and knapweed, another aggressive invader. Beaver activity and recreation use are other notable impacts to the riparian system.

Vegetation south of the river ranges from the salt desert type along the river to higher elevation pinyon-juniper canyons and mesas and sagebrush parks. The composition of pinyon-juniper varies from very dense stands of trees only to low - moderate amounts with a diverse understory of shrubs, forbs and grasses. These low to moderate density areas are important bighorn sheep habitat, especially as travel corridors. Sagebrush parks are scattered through this zone at various altitudes and with varying degrees of sagebrush density. The sagebrush component is vital for deer winter habitat. Some sagebrush parks support a high composition of crested wheatgrass, a result of plowing and seeding in the 1950 and 1960's. Fire, livestock grazing and historical vegetation treatments have been the major influences affecting the plant communities south of the river. Fire referenced here includes not only the direct influence of fire but also fire suppression efforts in the past. Fire suppression removes a natural disturbance from the system and thus removes a natural means of changing plant communities.

In 1993 an intensive vegetative inventory know as an Ecological Site Inventory (ESI) was completed for the area (see Upland ESI map found in Envelope). ESI provides a detailed description for an area in terms of species present and the percent composition and production of each. Once completed, we have very specific knowledge about the types of soils, the vegetation and the landscape. This information enables land managers to discover the natural potential of the land, its current ecological status and the difference between the two (see Ecological Condition Classes Map 4 - page 2-6). History of an area can help explain why it looks the way it does which can aid in predicting the anticipated results of various activities or disturbances.

Based on this knowledge, we can determine a site's capability for supporting a variety of plant and animal life. For example, through natural succession, a pinyon-juniper forest may have taken over what was once a grassland, reducing the availability of forage for livestock and grassland wildlife. Based on an understanding of the soils, vegetation and climate, we may know that this area has the potential for providing more grasses, and can make a management decision to remove some of the trees. In other instances, the inventory may tell us that an area has already met its potential for supporting plantlife, and that the natural potential community is, in fact, a pinyon-juniper woodland. Changes in those cases may be counter-productive. Decisions of this sort are made based on what land managers and the public would like the "desired plant community" to be.

II. Land Status

The planning area for the Ruby Canyon/Black Ridge plan encompasses 118,625 acres of land, 110,234 acres manar,ement by the BLM, 1,620 acres of Bureau of Reclamation land managed oy CDOW (Horsethief State Wildlife Area), and 6,771 acres of privately-owned land (see map, page vii).

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III. Cultural and Paleontological Resources

A. Cultural Resources

For over 10,000 years, the Ruby Canyon area has provided people with the necessities of life. The earliest human occupation of the area began about 9,500 B.C. and is called the Paleo-Indian Period. These early big-game hunters are designated by archaeologists as the Clovis Tradition. As the climate continued to change at the end of the last Ice Age, two other Paleo-Indian traditions appeared in the area, and are known as the Folsom and Plano Traditions.

About 5,500 B.C., a series of severe droughts occurred in the western United States which radically altered the way the prehistoric peoples adapted to the environment. The very large grazing animals became extinct and were gradually replaced by the animals and plants present today. The prehistoric Native Americans responded to the great droughts by migration, some of their populations moving out of the lower elevations of the Great Basin to the west, and the Great Plains to the east, and relocating at the higher elevations of the Colorado Plateau and the Southern Rocky Mountains. They diversified their hunting and gathering skills to include a wider range of plant and animal species. The increased use of grass seeds and other plants' seeds resulted in the development of grinding stones to process the seeds. Archaeologists call this the Early Archaic Period.

Around 3,500 B.C. the climate changed again, becoming cooler and wetter. This allowed for the expansion of the pinyon forest across vast stretches of the Colorado Plateau. The pine nuts from the pinyon trees provided a larger more reliable food source allowing the prehistoric Indian populations to expand and grow. A rich environment of diverse species of plants and animals developed on the Uncompahgre Plateau, of which the RCBR is a part, as well as in the surrounding areas. Archaeologists call this the Middle Archaic Period. Because of this rich environment, numerous prehistoric groups passed through the area. Due to the confluence of the Colorado and Gunnison Rivers, the Grand Junction area became a crossroads between the Colorado Plateau and the Southern Rocky Mountains.

About 1,000 B.C. the climate changed again, becoming much like it is today. Corn had been domesticated in Mexico and this new crop resource slowly worked its way north to the southwestern United States. Though corn had reached west-central Colorado by around 250 B.C., it was not readily adopted by the people living here at the time. Archaeologists call this the Late Archaic Period, which lasted until about 300 A.D. The bow and arrow appears here after about 300 A.D.

Adoption of corn horticulture by many groups eventually resulted in the development of the Anasazi in the Mesa Verde area of the Four Corners region of Colorado, New Mexico, Arizona, and Utah. Through contact with the Anasazi, some local Archaic groups began to practice corn horticulture when and where they could. This mixture of hunting and gathering supplemented by the growing of corn became what archaeologists call the Fremont culture. They are marked by their own distinctive forms of architecture, ceramics, and rock art.

Around 1300 to 1400 A.D. the Fremont culture fades from the archaeological record to be replaced by the people we eventually come to know as the historic Ute tribe. The Utes were the dominant tribal group in the area until their removal by the U.S. Calvery in 1880, thus opening up the area to American settlement.

For the Fremont Indians and others, the cliffs provided shelter, and the numerous small creeks provided water for them and the plants and animals they ate. More recently, settlers have passed through the area, grazing livestock, constructing railroads, and exploring for minerals. Evidence of these early and later inhabitants can be readily found. Fremont rock art is painted or pecked onto the walls of many canyons, and the floors of overhangs where they found shelter, still bear traces of their fires, tools and meals. Sometimes in close proximity to these prehistoric sites are 100 year old railroad camps. Each site reveals special information about the lives of our predecessors.

The sweeping views from the ridge tops and majestic canyon walls must have inspired the same awe and reverence most people experience today, making the canyons a special place to call home. In protecting these sites, the BLM's objective is to preserve this experience, and to provide visitors an opportunity to discover something new about themselves and their past. The best example of this is McDonald Creek Canyon in Rabbit Valley, a 1,144-acre cultural resource management area singled out because of its high concentration for rock art and living sites. The BLM's management of this area ensures that visitors will experience the area much as it was when prehistoric people lived there. The canyon is pristine with no obtrusive signs pointing to rock art locations, and the only trail is a dry, sandy creek bottom leading to the Colorado River. As an educational resource, McDonald Creek Canyon is used to teach students about how to protect the remnants of their past. Each spring, the BLM archaeologist takes students on trips down the canyon, showing them the plants and animals the Indians would have eaten and where they would have lived.

In the past, authorities believed the best protection for such sites was keeping them secret. However, the Grand Junction Resource Area has found that visitors to McDonald Creek act as a sort of 'Neighborhood Watch' program, discouraging destructive behavior. Photos taken in 1978 are used as a benchmark to monitor how well management is working. Evidence of success can be found in the fact that fewer pre-historic sites in the Grand Junction Resource Area are being vandalized today.

This technique of management through education will be used when the BLM develops a specific management plan for Sieber Canyon in the southern portion of the Ruby Canyon area.

B. Paleontological Resources

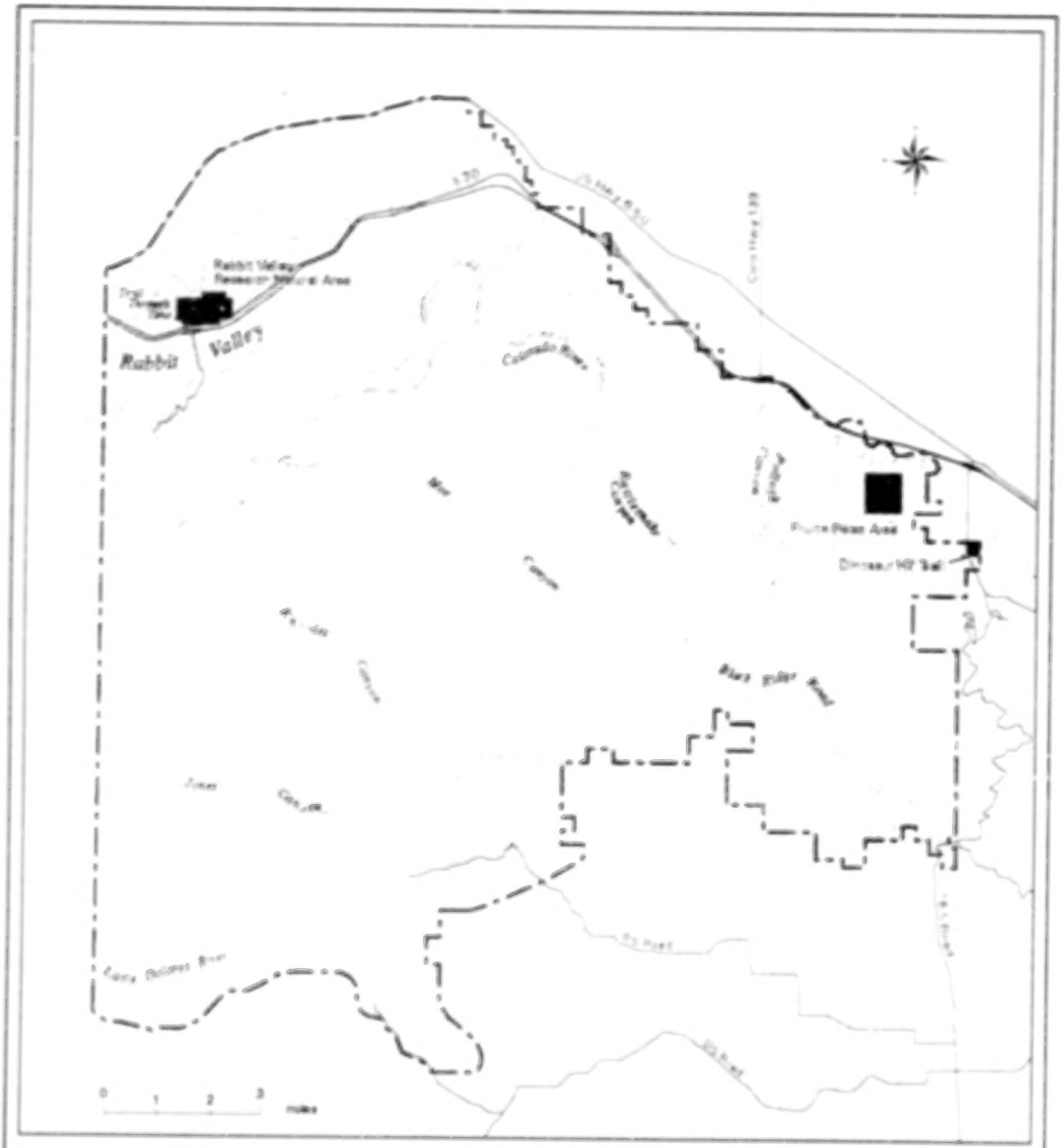
Imagine this area as it was 140 million years ago, not as a high desert, but as a semi-arid, vast floodplain with some lakes and low hills covered by giant conifer and cycad trees. The weather was warm and humid. Crocodiles and turtles lived in the ponds, lakes, stream, rivers and swamps and dinosaurs roamed about.

We can paint this vivid picture of Ruby Canyon's Jurassic Age because of the fossils found here. Over millions of years, rivers, streams, lakes and seas eroded entire mountain ranges and deposited thousands of feet of sediment. Remnants of plants, dinosaurs, and other fossils were trapped in these sediments and were turned to rock by the immense heat and pressure of the rock layers above them. Modern day erosion has exposed some of these fossils once again, and scientists study them and their locations to learn more about our prehistory (see map 5, next page). Significant paleontological areas depicted on the map are those areas known to contain high concentration of paleontological resources.

Special paleontological management areas, Fruita Paleontological Area, Dinosaur Hill and Rabbit Valley Research Natural Areas are local areas with on-going research and interpretation activities.

There are a number of very important concentrations of fossils within the Ruby Canyon area where scientists have discovered fossils unlike any others. On a ridge in the Black Ridge WSA, fossils of the oldest known flower have been found and at the Fruita Paleontology Area and at the active Mygatt-Moore Quarry in Rabbit Valley, dinosaur and other remains have been excavated which have changed the way scientists look at those species.

The protection, excavation, and exploration of these sites is made possible through cooperation with the Museum of Western Colorado and Dinamation International Society. Both the Fruita Paleontology Area and the Mygatt-Moore Quarry have been designated as Research Natural Areas and Areas of Critical Environmental Concern to protect the existing landscape and provide for continued scientific research. Each summer, both the Museum and Dinamation sponsor and train groups of volunteers to perform the tedious task of uncovering fragile fossils. As many as 300 volunteers come each year, some from as far away as Japan, and many pay tuition as part of an educational tour.



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Map 5. Management of Paleontological Resources

- Areas Managed For Protection of Significant Paleontological Resources
- Special Paleontological Management Areas

Each year, as many as 10,000 people stop at the Mygatt-Moore Quarry and travel the mile and a half Trail Through Time where fossil remains can be seen in place. The trail's interpretive brochures and signs are a cooperative effort of the Museum, Dinamation and the BLM. In the future these efforts will be expanded to include interpretive tours for visitors passing through the area, and a small facility has been suggested as well.

All excavation is done under permits issued by the BLM to universities and museums. Through a contract with the BLM, the Museum of Western Colorado curates artifacts and fossils, ensuring they are available to the scientific community for research. Throughout the Ruby Canyon area, clearances for paleontology and cultural resources are required before beginning any project or activity.

IV. Traditional Uses

Agriculture, ranching and mineral exploration have played a significant role in developing the culture of the Grand Valley. Local residents have a closeness to the land that is typical of western communities where survival itself often depends on the whims of nature.

Today, ranchers still rely on the Ruby Canyon area to provide forage for their herds. The area includes 16 grazing allotments (see map 6, page 2-13) used primarily in the winter and early spring, before livestock can be moved to higher elevations. While these allotments are integral to ranching operations, over time, ranchers have modified their operations to reduce impacts on other resources. For example, under current agreement with grazing permittees in the WSA, grazing has been excluded from Rattlesnake, Mee and Knowles Canyons to enhance riparian habitat. Grazing has also been eliminated from the Colorado River Allotment to protect riparian vegetation and scenic values. Combined with the areas excluded in the Mountain Island Allotment to protect cryptogamic soils, approximately one-third of the WSA is not being grazed. Further, some historic sheep allotments have been voluntarily converted to cattle use by ranchers to provide greater protection for the reintroduced desert bighorn sheep population. In some instances livestock grazing is coordinated with intense recreation use to avoid conflict.

Livestock operators and the BLM are working closely with other public land users to develop vegetative goals that not only meet the needs of the operator but also others as well. These common goals can provide for improved wildlife habitat and watershed conditions as well as scenic values. Grazing is used as one of the tools to accomplish these goals. The BLM continues to work with ranchers to protect the landscape and those they share it with. Allotments are monitored closely to ensure that conflicts between users are minimal.

Mineral exploration in the area has left some roads and a few test holes, however, miners have since left the area, having found little of value. Since protection of wildlife habitat, scenic values, and recreational opportunities is the BLM's primary focus here, the entire Ruby Canyon corridor south to the edge of the Black Ridge WSA has been withdrawn from mineral entry. North of the river any exploration and entry is subject to appropriate restrictions on use of the land.

V. Recreational Resources

Recreation is the fastest growing use of our public lands today. These lands provide an important outlet for our increasingly urban societies and bring tourist dollars to those communities fortunate enough to be located near them.

Visitor use of the Ruby Canyon Area has increased dramatically over the past 10 years. Visitors have requested a wide variety of recreational opportunities, from very structured to undeveloped. To respond to these needs, and to protect fragile resources, the BLM's focus here has been to provide primitive recreation experiences south of the Colorado River, and more developed recreation opportunities to the north. Within the area there are three concentrations of use.

A. The River

The Colorado River corridor from the Loma Boat Launch to the Utah state line is generally known as Ruby Canyon. Floatboating is the dominant public use; however, about five percent of use involves motorboats. Of the floatboating use, about 25 percent is canoe/kayak oriented, and 75 percent is by inflatable raft. About 65% of the floatboaters spend one or more nights on the river with 35 percent of them continuing on through adjacent Westwater Canyon in Utah. Along with shoreline camping, hiking the side canyons south of the river is a popular activity. Ruby Canyon is considered flatwater (Class I) and Westwater Canyon in Utah contains major whitewater rapids (Class III+).

At present, about 33 percent of the floatboating use is conducted by commercial river outfitters. A majority of the commercial trips continue on through Westwater Canyon. The remaining 66 percent of floatboating use is by private boaters, in numerous, typically smaller groups. In most years, floatboating does occur in February and November, but the primary boating season is April through October.

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Map 6. Grazing Allotments

6110 Sieber Canyon
6123 - Upper Bench
6125 - Lower Bench
6126 - 28 Hole
6130 Colorado Ridge
6131 - Leslie-Bays
6133 -Reservation
6135 Little Dolores Bench
6136 Knowles
6138 - Black Ridge
6141 - Burke
6142 - Three Canyons
6143 - Radio Tower
6147 - Holloway
6155 - Little Dolores Canyon
6167 - Battleship
6168 - Rattlesnake
6604 - Crow Bottom
6609 - Spann
6610 - Maluy
6612 - Jouflas
6613 - Rabbit Valley

Most of the motorboat use is by sportsmen and is highest during fall waterfowl hunting season. Motorboats are also used for deer hunting and spring/fall catfish fishing.

Each year, an average of 6,000 people float the 25 mile section of the Colorado River through Ruby Canyon. Most come from other towns in Colorado or from out of state. Almost 40 percent of these people are floating the canyon for the first time.

The BLM's goals for the area have been to: provide a safe, accessible launch site and a primitive recreation setting through Ruby Canyon. A map was developed to show boaters where to camp, encouraging them to use low impact techniques, and to provide information on possible hazards and rapids. Throughout the busy seasons, BLM field personnel assist visitors at the Loma Launch Site, patrol the river, organize river cleanups, and conduct studies to determine trends in visitor use and the level of impacts. The launch site and sanitary facilities are cooperatively maintained with the CDOW and the BLM continues to work on increasing the size of the facility to accommodate additional use.

B Rabbit Valley

In Colorado, well over half of all recreational use on BLM lands occurs on 15 percent of the land base. In the Grand Junction Resource Area, Rabbit Valley is the best example of this. The valley is just 30 minutes from Grand Junction, and I-70 provides easy access to this relatively remote area. In addition, Rabbit Valley is generally snow-free, attracting fall, winter and spring use when other areas are not accessible. Recreation use here has tripled in the last five years, requiring the BLM to implement more intensive management. This has involved identifying designated trail routes that direct the public to appropriate areas and providing facilities to protect resources.

To protect erosive soils, the BLM developed three group use camping areas with picnic tables and toilets, as well as a parking area large enough for horse and off-highway-vehicle (OHV) trailers. With the assistance of the Motorcycle Trail Riding Association, the BLM inventoried and designated trails for OHV use, rehabilitated those that were closed, and developed a map and interpretive brochure to educate visitors about where to go and how to preserve the area. The brochure is part of BLM's policy to educate users, and is supplemented on site by bulletin boards, signing and patrols and visitor contacts by the BLM Ranger and staff. Our "Pack-Your-Trash" program keeps the area clean, and reduces maintenance spending. The current management program is being monitored to ensure success, so a variety of recreational users can continue to enjoy this area.

C. Trails

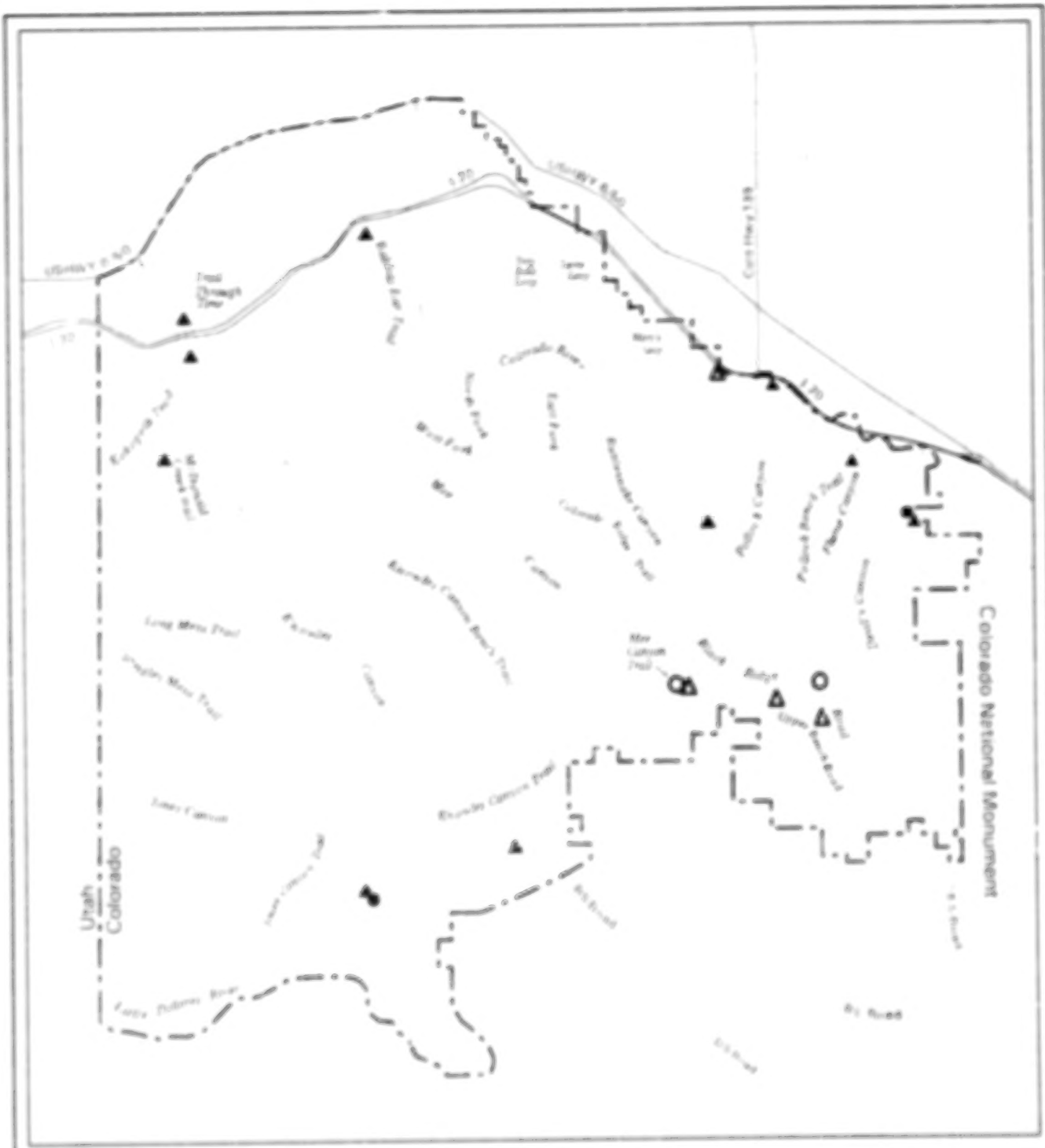
When recreation use begins to threaten fragile resources, the BLM's Grand Junction Resource Area has a history of working with recreational users to find new outlets, rather than prohibiting use. The trails constructed over the last 10 years in the Ruby Canyon are evidence of this.

In 1989 mountain bikes were beginning their first surge of popularity and local riders began looking for new places to travel. The lower reaches of some pristine canyons in the WSA began to feel the strain of this new use. To protect these areas, the BLM met with local mountain bikers to find more suitable areas. The result was the development and construction of Kokopelli's Mountain Bike Trail. Hundreds of volunteers worked with the BLM to connect 138 miles of old four-wheel drive roads and stretches of single track leading from the Loma Boat Launch to Moab, Utah. The BLM also worked with the local mountain bike organization to sign portions of the trail as loops. Today, an average of 15,000 to 16,000 riders use these loops each year. Of those registering at the trail heads in 1995, 39 percent were from outside Mesa County, bringing in important tourist dollars to the local economy. Other bike trails have been developed, such as the Horsethief Bench Loop with local volunteer support and labor.

Other trails have been built to respond to public demand while protecting the landscape. These include trails in the WSA to Rattlesnake Arches, and Knowles and Jones Canyons. Rabbit's Ear Trail was completed in October of 1992, built with the help of the Sierra Club to a river overlook in Rabbit Valley (see map 7 next page).

Estimated public recreation use of Black Ridge and Ruby Canyon are shown below for 1995.

Black Ridge	**Visits**	**Visitor Days**
Deer Hunting	550	1,350
Day Hiking	7,900	7,900
Backpacking	550	1,650
Mountain biking	2,900	2,900
Off-Highway Vehicle (to Arches)	2,300	2,300
Horseback Riding	375	375
TOTAL	**14,575**	**16,475**



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Map 7. Existing Roads and Trails

Existing Roads
Existing Trails
Proposed Gate
Proposed Trailhead
Existing Gate
Existing Trailhead
Public Lands within the Plannig Area
Planning Area Boundary
Major Drainages

Ruby Canyon		
Floatboating	6,000	10,000
Motorboating	1,000	1,300
Shoreline Camping	4,500	4,500
Fishing	500	500
Waterfowl Hunting	700	700
TOTAL	**12,700**	**17,000**

In all of the above areas and public land uses, it is safe to say that most uses are growing at least by five percent per year. Some notable exceptions include more rapid growth in mountain biking and all terrain vehicle use, a leveling off in deer hunting use, and reduced off-highway vehicle use in the study area resulting from recent closures inside the WSA.

D. Wilderness

Since 1974, the BLM has managed the 73,937-acre Black Ridge Canyons WSA (two WSAs combined into one unit) south of the Colorado River to preserve its wilderness characteristics (see map 8 page 2-19). The area was recommended to the President for wilderness designation in 1991, after intensive inventory and study of the area. In 1993, the President endorsed the area for wilderness designation and passed his recommendation onto Congress.

The Black Ridge Canyons WSA would be a significant addition to the National Wilderness Preservation System. Although close to an urban area, the WSA is very natural in character with few imprints of man. The area provides an environmental benchmark from which similar, but more intensively used areas can be compared. There are seven major canyons within the WSA that cut 500 to 1,000 feet into the Uncompahgre Plateau. Each canyon is characterized by deep main canyons with several secondary canyons. Hidden among these canyons are giant sandstone arches, amphitheater-like alcoves and caves and Precambrian granite outcrops which have created spectacular waterfalls and drop pools. Some of the canyons have narrow chasms while others are up to a half-mile wide. Between them are rambling mesas, sloping downward to the Colorado River.

The BLM has managed this area to preserve the experience of stepping back to a time before development when settlers arrived in the Grand Valley. It has also been managed to provide outstanding opportunities for solitude and primitive and unconfined recreation. The number of canyons allow visitors to disperse throughout

the WSA. Opportunities for solitude within a single canyon system are accentuated by isolation provided by the benches at various levels above the canyon floor. The broad expanses of the mesas, excellent topographic and vegetative screening, and the large size and configuration of the WSA all enhance outstanding opportunities for solitude.

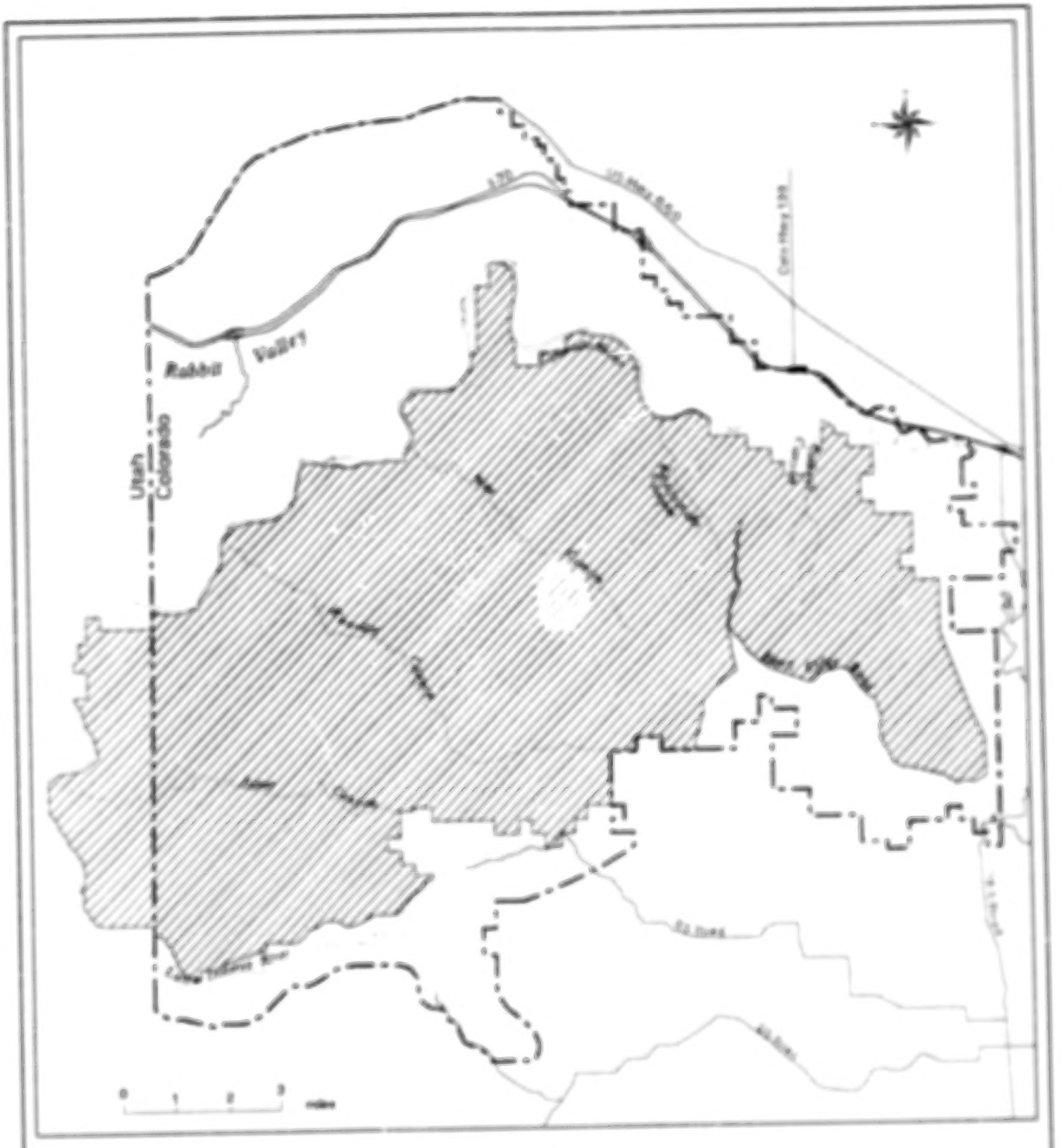
The Black Ridge Canyons WSA provides outstanding opportunities for primitive and unconfined recreation in close proximity to the populated Grand Valley. The WSA's outstanding scenery and landscape variety, interesting geologic features, extensive canyon systems, the Colorado River and cultural and paleontological resources contribute to oustanding opportunities for primitive recreation in the WSA. Topographic diveristy, unusual geologic features such as arches, spires and windows, and intermittent water courses all appeal to visitors. Along with hiking and backpacking, their activities in the WSA include picnicking, viewing outstanding scenery, horseback riding, photography, birdwatching, hunting and rock hounding.

In 1995, almost 14,000 recreationists visited the area to hike, backpack, horseback ride and photograph the area's outstanding scenery. Although the area's visitation continues to increase, the WSA's topography and vegetation allow visitors to disperse and be effectively screened from one another. The BLM has developed a low impact-trail system to help visitors disperse, explore and enjoy the area.

Rattlesnake Canyon is the most well known of the WSA's because of its concentration of natural sandstone arches. The visitor to Arches National Park has a very structured experience while the visitor to Rattlesnake Canyon is provided an opportunity to explore and discover in a non-motorized, natural setting.

BLM continues to improve the trailheads into the WSA. In 1993, a wilderness brochure was developed for the visitor to assist with information and access to the area. Protection of the wilderness resource is the major emphasis of ongoing education efforts.

Devils Canyon and Flume Canyon were blocked to public access up until their recent acquisition. In 1992, BLM acquired private lands being sub-divided in the mouth of Devils Canyon. In 1996, BLM acquired 320 acres in lower Flume Canyon.



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Map 8. Black Ridge Canyons Wilderness Study Area

Wilderness Study Area

Public Lands within the Plannig Area

Planning Area Boundary

The Black Ridge Canyons WSA consists of 73,937 acres and is considered by BLM to be one of the most outstanding WSAs in Colorado. All of the lands acquired (320 acres) in Flume Canyon and 200 acres of the lands in Devils Canyon would qualify for wilderness as contiguous parcels to the WSA. These parcels are natural in character and have canyon topography and vegetation similar to the contiguous WSA. These parcels would enhance the adjacent canyons as they provide an integral part of the canyon ecosystem. And although these small parcels by themselves do not possess outstanding opportunities for solitude and primitive and unconfined recreation, they do enhance these opportunities in the contiguous WSA (see Appendix G - Acquired Lands Considered for Wilderness).

Supplemental values for these additional parcels include their proximity to the Colorado National Monument, a large urban population, wildlife values, geologic values, and cultural and paleontological values. More detailed information is available in the Wilderness Intensive Inventory for the Black Ridge Canyons WSA.

CHAPTER 3

Visioning Process

In order to develop a clear, concise vision statement for the Ruby Canyon/ Black Ridge Ecosystem, ad hoc committee members were used to develop a vision statement. The goal of this process was to better define: 1) the group's vision for the future of the community, and 2) the group's vision for the future of the RCBR area that will help achieve this vision. The process also included the identification of appropriate roles for each of the key sectors to achieve the overall vision. Three different groups met to describe their vision for the community's future. Information from all three groups was prioritized into one large group vision for the community.

I. Vision Statement

The Ruby Canyon/Black Ridge Ecosystem will continue to contribute to the current quality of life for the Grand Valley and will be managed for an ideal balance of use and preservation.

Community/Partnership Vision

The community will work together to educate visitors about back-country manners and respect for other users so that opportunities for positive experiences can be sustained.

Partners with tourism organizations will foster user ethics and help to meet other goals including maintaining use at a level that does not exceed the carrying capacity of the area.

Area Vision

The area will help contribute to a sustainable and stable economy while the community preserves the area's environmental health.

Most of the area will be kept "wild", but people will be able to drive on well-defined roads and trails in some places.

II Roles of Various Partners

This integrated management plan represents an expanded public lands management perspective. Neither BLM, its private sector service partners, nor even local host communities are "sole-source" providers of the benefits RCBR customers (both visitors and residents) receive. Adoption of a Benefits-Based approach therefore requires that all providers collaborate in the delivery of targeted products and services. This kind of collaboration has been nurtured throughout the development of the plan and will need to be strengthened to implement the plan design.

This plan was developed through the involvement of many partners, not just by BLM. These represent three primary providers within the surrounding host communities: public land managers, recreation-tourism industry service providers, and local residents and their governments. The Ad-Hoc Committee was formed to represent these interests in the form of a steering committee. Because this plan cannot be implemented without this kind of cooperative management involvement, it also identifies essential roles of BLM's other key service providers.

In general, BLM's role is to engage its service delivery system to protect and maintain the character and quality of public land resources, provide facilities, distribute appropriate visitor information, and manage visitors. The role of the private sector recreation-tourism service partners has both an on-site and off-site component. On-site, our service partners play a very important role in providing tours and in guiding and outfitting clients seeking these services. RCBR customers, BLM and other land managers, and our local community partners rely heavily on the industry's off-site marketing (i.e., visitor information) services. The role of the local host communities and their governments is no less significant in the delivery of targeted benefit opportunities; these include important support services from the hospitality industry including transportation, overnight accommodations, restaurants, etc. Local host communities are also very important in helping to ensure that BLM and recreation-tourism service provider actions focus on meeting real needs of local communities and their guests.

III Responsibilities of Various Partners

As part of the visioning process, the following statements were crafted to depict what each of the three primary providers has agreed to do to help achieve the above vision.

- Land Managers (agencies and private landowners):

  "Protect resources"

  "Determine carrying capacity"

"Use the media to get message out before crisis"

"Encourage conservation easement to preserve rural character on approaches (access) to RCBR"

"Cooperate with tourism industry to achieve Community and RCBR Visions"

"Fund further research of local riparian ecosystems"

"Enforce the rules"

"Invoke restrictions when necessary"

"Develop appropriate literature for education and promotion of RCBR with other user groups and tourism industry"

"Coordinate partnership focus"

- Tourism Industry (businesses and organizations):

"Help educate visitors"

"Definition and promotion to appropriate market niches"

"Seek quality not quantity of experiences"

"Show restraint to achieve control to prevent over use"

"Meld local community rights with promoting resources"

"Give out accurate information"

"Maintain the surprise in "Surprising Choices" -- Don't tell them everything"

- Host Communities (local governments, residents, and interest groups):

"Take the lead in showing responsible use"

"Encourage conservation easements to preserve approaches to RCBR"

"Hold workshops to explain partnerships and give people ideas"

"Define other resources outside of RCBR"

"Maintain active partnerships with land managers and the tourism industry"

"Local education facilities educating toward similar goals"

"Work with BLM for help in educating public to the pleasures and pitfalls of use and overuse"

All of this is made much more explicit in Chapter V in the form of specific management actions that each of these three key providers will undertake to achieve these objectives within each of the area's three management zones.

CHAPTER 4

General Management Goals

I. General Management Goals

The main thrust of this plan will be to manage the RCBR ecosystem using a benefits based management approach. The BLM and our interested publics will strive to protect and restore this native ecosystem not only for the value of the ecosystem itself, but as a more practical means of managing land and water for other values such as species preservation, biodiversity, clean water and economic stability. The BLM and its partners must work to achieve this not only on the public lands but in the Grand Valley as a whole.

The following are the general management goals for the Ruby Canyon/Black Ridge Planning Area:

1. Manage the ecosystem to achieve targeted individual, social, economic and environmental benefits.

2. Manage to deliver benefits by maintaining opportunities for visitors to engage in a diversity of targeted activities in a variety of settings.

3. Maintain and enhance partnerships with other land managing agencies, user groups, community and tourism organizations to help maintain the health of the ecosystem and to provide on-site opportunities for RCBR visitors to realize desired experiences and benefits.

4. Manage the historical, cultural and paleontological resources in the ecosystem for scientific information, education, public values and conservation.

5 Manage the Black Ridge Canyons WSA to protect wilderness values.

6 Continue to acquire lands within the ecosystem to provide for better natural resource and public use management, and to eliminate incompatible land uses on private land inholdings.

7 Attain diverse habitats (forage, cover, water) and functioning watersheds by enhancing the ecological processes to achieve the desired plant communities, improve water quality and reduce soil erosion.

8 Provide for a rural environment that contributes to a sustainable economy in harmony with ecological and environmental health.

9 Educate the public on management actions and their desired effect on ecological processes.

10 Provide an aesthetically pleasing landscape which is compatible with the diverse uses.

11 Protect, promote and enhance native wildlife, rare plants and their habitats on an opportunity basis, yet in priority order from globally, to nationally rare species, to locally popular species.

12 Consistently present archaeological, wildlife, and rare plant information in the ecoregional context, i.e., the Great Basin, Intermountain Desert and the Colorado Plateau.

CHAPTER 5

Objectives and Actions

Management objectives, as portrayed in this plan, and in the context of a BBM approach, are the desired outcomes and benefits that we hope to maintain or achieve for each component of the RCBR ecosystem.

There are three components to the recreation management objectives described in this plan:

1. **Activities** - Benefits will be delivered by maintaining opportunities for visitors to engage in certain targeted activities. The resulting activity opportunities enable people to engage in highly valued leisure activities.

2. **Psychological Experiences** - Certain zones and areas will be managed to target the delivery of certain psychological experiences and benefit opportunities. Psychological experiences can be defined as "outcomes realized by individual participants, on-site during their engagements." Achieving the objectives in this plan will help to add value to peoples lives, and to maintain the biophysical integrity of the RCBR ecosystem.

3. **Other Benefits** - The "other benefits" as they pertain to management objectives result in "improved conditions and the prevention of worse conditions" to four different entities.

To Individuals - psychological and physiological benefits to the individual (both on-site and off-site)

To Society - benefits that are realized by society (individual households and communities)

To Economies - benefits that accrue to the local and regional economy (e.g., raising of livestock, game harvesting, etc.)

To the Environment - benefits that are realized by the natural and cultural environment.

This plan differs from past plans in that it explicitly targets certain kinds of activity and benefit opportunities. In order to determine which activity and benefit opportunity outputs to target in the management plan objectives, certain selection criteria were used. These selection criteria are listed in Appendix B.

The targeted activity opportunities, and targeted benefit outcomes are summarized in Tables 1 and 2 in Appendix B.

Management Prescriptions are the unnecessary physical, social, and managerial conditions that need to exist to realize the achievement of the management objectives. Management prescriptions will describe how the BLM and its various partners will deliver certain benefit opportunities, and what the BLM and its various partners will deliver. Recreation management prescriptions are described for three different settings.

Physical Setting - Describes the land and facilities. Prescribes the character of resources and facilities, including remoteness, degree of naturalness and type and amount of development.

Social Setting - Describes the people - their behavior and trappings. Prescribes the character of human use and occupancy, including the amount of contact with other people and evidence of their having been there.

Managerial Setting - Describes the administrative environment. Prescribes the character of the service delivery system, including visitor services provided by the collaborating partners, programs, the degree of management control and regulation, and the overall collaborative community partnership environment.

In order to portray the various "targeted settings", the RCBR planning area was divided into eight recreation management zones (see map on page ix). The Recreation Opportunity Spectrum (ROS) process was then used to map these zones into various classes. The ROS process was specifically used in this plan to facilitate

the achievement of targeted benefits. A description of the ROS process and the classes used for the RCBR planning area are displayed and described in Appendix C. Table 3 portrays the "Targeted Physical, Social and Administrative ROS Settings for the RCBR Environment".

The relationship between the ROS settings and the targeted activities, psychological experiences, on-site and off-site benefits is portrayed in Appendix D through the "Benefit Chain of Causality."

Management Actions - This portion of Chapter 5 pertains to what BLM and the various partners will do to help achieve the the management objectives.

The management objectives, management prescriptions, and management actions will be described for the three zones -- north of the Colorado River, the Colorado River and south of the Colorado River.

A. NORTH OF THE COLORADO RIVER

1. RECREATION

Mary's and Lions Loop Area

Management Objectives:

By the year 2000, manage this zone to provide opportunities for visitors to engage in Single and Double Track Mountain Biking and Day Hiking activities, providing no less than 85% of responding visitors and affected community residents at least a "moderate" realization of these benefits (i.e., 3.5 on a probability scale where 1 = not at all, 2 = somewhat, 3 = moderate, 4 = complete/total realization):

Psychological Experiences (On-site only)

- Meeting desired challenges
- Enjoy risk-taking canyon adventure
- Improving skills
- Enjoying strenuous physical exercise
- Testing your endurance
- Quickly accessing natural resource environments
- Enjoying frequent exercise
- Escaping everyday responsibilities for awhile
- Releasing or reducing some built-up mental tensions

Individual Benefits -- psychological & physiological (most significant)

- Improved physical fitness/better health maintenance
- Reduced hypertension-high blood pressure
- Restored mind from unwanted stress
- Improved self-competence
- Improved outdoor knowledge,skills & self confidence
- Improved problem solving skills
- Enhanced sense of freedom
- Greater cultivation of outdoor-oriented lifestyle
- Increased quality of life

Household & Community Benefits (most significant)

- Heightened sense of community pride and satisfaction

Economic Benefits (most significant)

- Increased work productivity
- Well-equiped visitor-customers
- Increased value added to local-regional economy

Environmental Benefits (most significant)

- None

Management Prescriptions: Inputs to Recreation Settings and the Service Delivery System (See Appendix C for a detailed description of each prescriptive class)

Deliver the benefits by maintaining the following diversity of physical, social, and managerial settings

*Physical: The **Land** Resources and Facilities*

Rural -- Front Country -- Middle Country

*Social: The **People** Visitors, Guests & Customers*

Rural -- Front Country -- Middle Country

*Managerial: The **Administrative/Program environment** BLM & Providing Partner Operations*

Rural -- Front Country -- Middle Country

Management Actions for Mary's and Lion's Loop

Resources and Facilities -- Physical Setting:

a. Provide simple basic interpretive messages incorporating the following themes:

Informing visitors about specific activity and benefit opportunities the zone is being managed to provide.

Preparing visitors for on-site canyon country environmental conditions and encourage them to adopt a responsible use ethic that respects:

- other visitor's experiences
- use regulations, including appropriate firearms use
- authorized livestock grazing

Inform visitors of traditional high use seasons and weekends.

b. Construct simple wayside interpretive exhibits at the following locations consisting of the following components:

Kokopelli's Trailhead: Combination Interpretive/Informational Exhibit

- Interpreting targeted Settings and Activity and Benefit Opportunities.
- Map depicting Kokopelli's Trail.
- Interpret an appropriate user ethic for single-track mountain biking.

Mack Parking Area: Map of loop trails, designated routes, and single-track mountain bike user ethics.

Mountain Bike Loop Intersections: Map of loop trails, designated routes, and mountain bike user ethics.

c. Improve and harden the undeveloped parking area immediately south of the Mack exit, behind the I-70 weigh station on the frontage road, and on the newly acquired HT property on the bench above the river, by signing, installing rock barr[illegible]d graveling the lots.

d. Do not develop campgrounds. Encourage visitors to stay at commercial campsites in Fruita or Highline Lake State Park.

e. Meet the needs for growing mountain bike trails in the planning area by first expanding single-track mountain bike trail opportunities in this zone.

f. Designate routes in this zone so that only marked routes are open to mechanized and motorized travel.

g. On an on-going basis, to reduce hazardous situations and user conflicts, designate certain problem single-track trails as one-way directional routes.

h. Prohibit motorized and mechanized access to the river bottom on the newly acquired Horsethief properties.

i. Keep the remainder of this zone free of any further development to maintain its overall character quality (including aesthetics).

Human Use and Occupancy -- Social Setting:

a. Encourage mountain bike (mechanized) use but discourage motorcycle and other motorized OHV use.

b. Encourage day-use of the zone; invite visitors to stay at commercial campgrounds in Fruita or at Highline Lake State Park.

c. Encourage stoves but discourage open fires by not providing campfire rings or grates.

Service Delivery System -- Administrative Setting:

a. To resolve potential conflicts between bikers, employ indirect measures, including an on-site management presence, user education and information, before resorting to more direct controls.

b. To resolve conflicts with livestock impacts on wet trails, reroute trails and work with livestock operators on placement of water tanks.

c. Group events are welcomed but will be limited to no more than two large events per month.

d. Develop a comprehensive informational list of service providers and provider services and furnish to visitors at recreation-tourism industry outlets, at the BLM office, and at Kokopelli's Trailhead.

e. Encourage local entrepreneurs to offer guided rides and shuttle services to various ingress-egress points along Kokopelli's Trail.

How the Tourism Industry Can Help:

a. Market Kokopelli's Trail as a regional-national attraction (but single-track loop riding opportunities primarily as a local attraction).

b. Ensure that all zone brochures developed by local business, the Grand Valley tourism industry, COPMOBA, the Grand Junction Natural Resources Council, and the BLM are geared around the above interpretive themes, and explicitly describe the targeted settings and resulting activity and benefit opportunities.

c. Ensure that marketing materials for the overall region are definitive enough to ensure that visitors can determine whether single-track mountain bike trail riding opportunities are what they seek.

d. To maintain targeted benefit opportunities, publishers will be encouraged to write about Kokopelli's Trail but not focus on loops.

How Interest and Volunteer Groups Can Help:

a. Encourage mountain bike organizations (including the COPMOBA) to adopt the trails to help organize and conduct patrols and maintain the trails.

b. Assist in the development of brochures geared around the above interpretive themes.

Rabbit Valley Single and Two-track Riding Area

Management Objectives:

By the year 2000, manage this zone to provide opportunities for visitors to engage in single and two-track mountain biking and off-highway vehicle driving activities, providing no less than 85% of responding visitors and affected community residents at least a "moderate" realization of these benefits (i.e., 3.5 on a probability scale where 1 = not at all, 2 = somewhat, 3 = moderate, 4 = complete/total realization):

Psychological Experiences (On-site)

- Quickly accessing natural resource environments
- Enjoying frequent exercise
- Enjoying frequent access to a range of physical challenge
- Enjoying the closeness of family and friends
- Enjoying group outdoor events
- Enjoying learning outdoor recreation & outdoor social skills
- Escaping everyday responsibilities for awhile

Individual Benefits -- psychological & physiological (most significant)

- Restored body from persistent fatigue
- Restored mind from unwanted stress
- Improved leadership abilities
- Greater environmental awareness and sensitivity
- Well-informed and more responsible visitors

Household & Community Benefits (most significant)

- Improved opportunity to keep vari-skilled groups together
- Maintained and enhanced group cohesion & family bonding
- Greater sensitivity to the recreational preferences of others

Economic Benefits (most significant)

- None

Environmental Benefits (most significant)

- Greater environmental stewardship

Management Prescriptions: Inputs to Recreation Settings and the Service Delivery System (See Appendix C for a detailed description of each prescriptive class)

Deliver the benefits by maintaining the following diversity of physical, social, and managerial settings

*Physical: The **Land** Resources and Facilities*

Front Country -- Middle Country

*Social: The **People** Visitors, Guests & Customers*

Front Country -- Middle Country

*Managerial: The **Administrative/Program environment** BLM & Providing Partner Operations*

Front Country -- Middle Country

Management Actions for Rabbit Valley -- Riding Area

Resources and Facilities -- Physical Setting:

a. Provide simple basic interpretive messages incorporating the following themes

Informing visitors about specific activity and benefit opportunities the zone is being managed to provide

Preparing visitors for on-site canyon country environmental conditions and encourage them to adopt a responsible use ethic that respects

- other visitor's experiences using the single-track trail system
- adjacent private landowners
- resources, including significant area cultural and paleontology attractions

- use regulations, including appropriate firearms use
  Inform visitors of traditional high use seasons and weekends.

b. Construct simple wayside interpretive exhibits at the following locations consisting of the following components:

Main Rabbit Valley Entrance - Staging Area: Combination interpretive/ informational exhibit:

- Interpreting targeted settings and activity and benefit opportunities
- Map depicting Rabbit Valley Riding Area, designated routes, and Designated developed/undeveloped recreation sites (high priority)
- Interpret an appropriate user ethic for undeveloped camping

Rabbit Valley Campsite (first campsite): Map of Rabbit Valley depicting riding area, designated routes, and designated developed and undeveloped recreation sites (high priority).

Colorado-Utah State Line: Map of Rabbit Valley depicting riding area, designated routes, and designated developed and undeveloped recreation sites (high priority).

Salt Creek Overlook: Interpretive exhibit interpreting Black Ridge Panorama (low priority).

c. The existing capacity and character quality of the Castle Rock and Knowles Canyon Campgrounds will be maintained.

d. Expand/Reroute single-track trail system to include the Rim Trail and all identified "potential" trails (i.e., trails that are suitable except for requisite cultural clearances and those not having legal access across private inholdings).

e. Inventory the area between I-70 and US Highway 6 & 50 to expand single-track trail riding opportunities in Rabbit Valley and conceivably connect into the Yampa Valley trail system via Baxter Pass.

f. Expand the designated route system to include the area between I-70 and US Highway 6 & 50 so that only marked routes in this area also are open to motorized and mechanized travel.

g. On an on-going basis, all single-track trails which are becoming too wide will be temporarily closed to allow natural rehabilitation to occur.

k. On an on-going basis, to reduce hazardous situations and user conflicts, designate certain problem single-track trails as one-way directional routes.

h. Keep the remainder of this zone (core) free of any further development to maintain its overall aesthetic quality.

Maintain the existing landscape character of the Rabbit Valley viewshed south of I-70 at the Rabbit Valley Interchange (see Rabbit Valley Trail Through Time zone prescriptions for how the northern viewshed at the I-70 interchange will be managed).

Human Use and Occupancy -- Social Setting:

a. Except for group events, provide, through visitor information and education a social setting consistent with the character of the zone.

b. Encourage day use of the zone.

c. Encourage the use of stoves primarily, but provide campfire rings and grates for open fires at designated sites; open fires at undesignated sites will be authorized only by permit in the group use area.

d. Any organized group use occurring in Rabbit Valley where "special management" is needed must request a special recreation permit (SRP) and may be subject to additional cost recovery charges. Special management is where resource conditions, use, health and safety concerns require specific actions or manpower to maintain resource objectives. Examples include: large civic club events, concerts, scout gatherings, rendezvous, etc. Casual use activities will be exempt from the SRP process and fees.

Service Delivery System -- Administrative Setting:

a. Shift the location where existing BLM contact personnel spend their time, from being dispersed throughout the area to concentrating on primary ingress-egress routes to promote the achievement of targeted benefits that are dependent upon being able to more easily get away from a highly visible on-site BLM management presence.

b. To resolve existing user group conflicts employ indirect measures, including an on-site management presence, user education and information, and exhaust all of them before resorting to direct controls.

c. To allow an increasing number and diversity of visitors to achieve the benefits the area offers, no one person or group may camp in the same location for more than seven consecutive nights within a 30-day period.

d. Encourage visitors to use existing developed recreation sites and certain historically used undeveloped sites by signing.

e. Develop a comprehensive informational list of service providers and services provided and make it readily available to zone visitors through recreation-tourism industry outlets, at BLM's office, and at staging area.

f. Encourage group events and activities to occur within an identified group use area in this zone.

g. Coordinate with the BLM Grand Resource Area in Moab, Utah to make trail riding opportunities and travel management regulations along the state line compatible.

h. Develop a cooperative agreement with private landowners to authorize BLM to help eliminate public lands visitor impacts on their lands.

i. Encourage local entrepreneurs to continue offering shuttle service to Rabbit Valley, for mountain bikers in particular.

How the Tourism Industry Can Help:

a. Market Kokopelli's Trail as a regional-national attraction (market single-track loop riding opportunities locally).

b. Ensure that all zone brochures developed by local business, local off-highway vehicle clubs, the Grand Valley tourism industry, the Grand Valley Natural Resources and Tourism Council and the BLM are geared around the above interpretive themes, and explicitly describe the targeted settings and resulting activity and benefit opportunities.

c. Ensure that marketing materials for the overall region are definitive enough to ensure that trail riding opportunities and not off-trail, cross-country riding experiences are what visitors seek.

d. To maintain targeted benefit opportunities, publishers will be encouraged to write about Kokopelli's Trail but not focus on other Rabbit Valley riding opportunities.

How Interest and Volunteer Groups Can Help:

a. Encourage motorcycle (including the Motorcycle Trail Riding Association) and mountain bike organizations (including the Colorado Plateau Mountain Bike Trail Association) to adopt the trails to help organize and conduct patrols and maintain the trails.

b. Assist in the development of brochures geared around the above interpretive themes.

Rabbit Valley Dinosaur Quarry/Trail Through Time

Management Objectives:

By the year 2000, manage this zone to provide opportunities for visitors to engage in Dinosaur fossil viewing activities, providing no less than 85% of responding visitors and affected community residents at least a 'moderate' realization of these benefits (i.e., 3.5 on a probability scale where 1 = not at all, 2 = somewhat, 3 = moderate, 4 = complete/total realization).

Psychological Experiences (On-site only)

- Enjoying meeting new people having similar interests
- Enjoying directed experiencial learning about dinosaur ecology and area geology
- Enjoying viewing/examining dinosaur fossils on your own in their natural setting

Individual Benefits -- psychological & physiological (most significant)

- Improved paleo curation skills
- Improved knowledge of area paleontology and geology
- Heightened awareness and improved understanding and appreciation of how dinosuars lived, died and are still preserved
- Greater overall awareness and understanding of and sensitivity to paleontology

Household & Community Benefits (most significant)

- Improved understanding of other people
- Heightened sense of community pride and satisfaction

- improved social cohesion with people of the community having similar interests
- Reduced number of at-risk youth

Economic Benefits (most significant)

- Increased value added to local-regional economy

Environmental Benefits (most significant)

- Greater community involvement in paleo issues

Management Prescriptions: Inputs to Recreation Settings and the Service Delivery System (See Appendix C for a detailed description of each prescriptive class)

Deliver the benefits by maintaining the following diversity of physical, social, and managerial settings

Physical: The ***Land*** *Resources and Facilities*

Front Country -- Rural

Social: The ***People*** *Visitors, Guests & Customers*

Middle Country -- Rural

Managerial: The ***Administrative/Program environment*** *BLM & Providing Partner Operations*

Urban -- Rural -- Front Country

Management Actions for Trail Through Time Area

Resources and Facilities -- Physical Setting:

a. Maintain and extend the existing Trail Thru Time to add another loop, to provide universal accessibility

b Construct a small-scale, open design (i.e., to accommodate visitors with limited, part-time staffing) Visitor Contact Station for visitor outreach to:

- Provide information about Rabbit Valley, public lands in western Colorado, and regional tourism attractions.
- Foster greater stewardship of the land.

c Design and construct Trail Thru Time Interpretive Exhibits and provide limited personal services interpretive tours addressing the primary themes of paleontology and available benefit opportunities to promote achievement of targeted benefits.

d Develop an interpretive overlook exhibit to promote better visibility and understanding of quarry operations.

Human Use and Occupancy -- Social Setting:

a Provide a social setting consistent with the rural/urban character of the area (adjacent to I-70), where the group size is unlimited.

Service Delivery System -- Administrative Setting:

a Cooperatively manage the Trail Thru Time site and quarry through a CMA among BLM, the MWC, and DIS to expand the scientific body of paleontology knowledge.

b As part of the Grand Valley "Jurrasic Park" visitor package, work with the Grand Valley Natural Resources and Tourism Council, the City of Fruita, the Visitors and Convention Bureau, the MWC, and the Devils Canyon Science and Learning Center to provide descriptive, accurate information and interpretive material on the Trail Through Time attraction.

How School District 51 Can Help

a Develop an outdoor classroom curriculum that incorporates on-site visits.

How the Tourism Industry Can Help:

a Cooperate with BLM and the school district to develop and market the quarry's educational opportunities.

b Ensure that all brochures developed for the zone explicitly describe the targeted benefit opportunities.

How Interest and Volunteer Groups Can Help:

a Staff the visitor contact station primarily with volunteers from cooperating partners on a part-time basis to serve peak use days.

McDonald Creek/Wildhorse Mesa/Rabbits Ear Mesa Areas

Management Objectives:

By the year 2000, manage this zone to provide opportunities for visitors to engage in hiking and horseback riding and rock art viewing activities providing no less than 85% of responding visitors and affected community residents at least a "moderate" realization of these benefits (i.e., 3.5 on a probability scale where 1 = not at all, 2 = somewhat, 3 = moderate, 4 = complete/total realization).

Psychological Experiences (On-site)

- Quickly accessing natural resource environments
- Enjoying frequent exercise
- Enjoying the closeness of friends and family
- Discovering/contemplating man's relationship with the land (Rabbits Ear)
- Enjoying exploration
- Enjoying being able to discover and learn about earlier cultures (McDonald Cr.)
- Enjoying canyon, river and rock art aesthetics

Individual Benefits -- psychological & physiological (most significant)

- Improved self reliance
- Improved understanding of human dependency on the land
- Increased knowledge of and sensitivity to earlier cultures
- Improved ability to relate to ranching and rural cultures
- Enhanced sense of stewardship for private land and respect for traditional cultures
- Enhanced cultural resource stewardship ethic
- Enhanced sense of freedom

- Greater cultivation of outdoor oriented lifestyle
- Increased quality of life
- Greater aesthetic appreciation

Household & Community Benefits (most significant)

- Greater nurturance of others
- Greater tolerance among traditional and new users

Economic Benefits (most significant)

- None

Environmental Benefits (most significant)

- Greater environmental stewardship
- Improved maintenance of biophysical systems

Management Prescriptions: Inputs to Recreation Settings and the Service Delivery System (See Appendix C for a detailed description of each prescriptive class)

Deliver the benefits by maintaining the following diversity of physical, social, and managerial settings

*Physical: The **Land** Resources and Facilities*

Backcountry

*Social: The **People** Visitors, Guests & Customers*

Backcountry

*Managerial: The **Administrative/Program environment** BLM & Providing Partner Operations*

Backcountry

Management Actions for Rabbit Valley -- McDonald Creek, Wildhorse Mesa and Rabbits Ear Mesa

Resources & Facilities--*Physical Setting*:

a. Provide simple basic interpretive messages incorporating the following themes:

Informing visitors about specific Activity and Benefit Opportunities the zone is being managed to provide.

Preparing visitors for on-site canyon country environmental conditions and encourage them to adopt a responsible use ethic that respects:

- other visitor's experiences
- adjacent private landowners
- resources, including significant area cultural and paleo attractions
- use regulations, including appropriate firearms use

Inform visitors of traditional high use seasons and weekends.

b. Construct simple wayside interpretive exhibits at the following locations consisting of the following components:

McDonald Creek: Combination Interpretive/Informational Exhibit.

- Interpreting targeted Settings and Activity & Benefit Opportunities
- Map Depicting cultural management area
- Interpret an appropriate user ethic for viewing rock art

Rabbits Ear Trailhead:

- Map of route to Ruby Canyon Overlook
- Interpreting the value of and respect for rural lifestyles

Ruby Canyon Overlook: informational sign and landscape panorama

c. Keep the remainder of this zone (core) free of any further development to maintain its overall aesthetic quality

d. If the Gibson property is acquired, convert the access road to the river to a hiking trail to enlarge the Back Country physical setting

Human Use and Occupancy--*Social Setting*:

a. Provide a social setting consistent with the character of the zone, limiting the size of groups to 12 people through visitor information and education (except for McDonald Creek because of its significance for teaching cultural awareness).

b. Encourage only day-use of the zone

c. Maintain opportunities for limited overnight use in Rabbits Ear and Wildhorse Mesa, but prohibit overnight use in McDonald Creek Cultural Resource Management Area

d. Open fires will be prohibited within McDonald Creek Cultural Resource Management Area

Service Delivery System--Administrative Setting.

a. BLM contact personnel will spend their time concentrating on primary ingress-egress routes.

b. To allow an increasing number and diversity of visitors to achieve the benefits the area offers, no one person or group may camp in the same location for more than seven consecutive nights within a 30-day period.

c. Develop a cooperative agreement with willing private landowners to authorize BLM to help eliminate Public Lands visitor impacts on their lands.

d. Encourage local tourism industry and businesses to market use of the Rabbit's Ear as a soft adventure day-outing.

How the Tourism Industry Can Help:

a. Encourage local tourism industry and businesses to market use of the Rabbit's Ear as a soft adventure day-outing

b. Ensure that all zone brochures developed by local business or the Grand Valley tourism industry, in coordination with the Grand Valley Natural Resources and Tourism Council and with BLM's assistance, are geared around the above interpretive themes, and explicitly describe the targeted settings and resulting activity and benefit opportunities.

c. Ensure that marketing materials for the overall region are definitive enough to ensure that visitors can determine whether the opportunities available in this zone are what they seek--it provides trail riding opportunities and not off-trail, cross-country riding experiences

d. To maintain targeted Benefit Opportunities, publishers will be encouraged to write about Kokopelli's Trail but not focus on other Rabbit Valley riding opportunities

How Interest & Volunteer Groups Can Help:

a. Encourage motorcycle (including the Motorcycle Trail Riding Association) and mountain bike organizations (including the Colorado Plateau Mountain Bike Trail Association) to adopt the trails to help organize and conduct patrols and maintain the trails

b. Assist in the development of brochures geared around the above interpretive themes

2. ARCHAEOLOGIC-HISTORIC-PALEONTOLOGIC

Management Objectives:

Manage the northern zone to provide for:

a. The protection of archaeologically, historically, and paleontologically sensitive sites or localities in areas still open to locatable mineral entry

b. The protection of all archaeological and historical sensitive areas with special attention to areas of prescribed fire and planned prescribed burns in conformance with the fire management plan.

c. The collection of scientifically important archaeological and or historical objects and data only by individuals or organizations with proper permits.

d. The collection of fossil wood and common invertebrates by private individuals in reasonable quantities, but done so as not to totally deplete the resource in any one area.

Management Prescriptions:

Deliver the benefits by adhereing to the following management prescriptions.

a. Maintaining partnerships that are well-established under Cooperative Management Agreements (CMA). So far, there is a CMA among BLM, Museum of Western Colorado (MWC) and Dinamation International Society (DIS) for Rabbit Valley Research Natural Area, Split Rock, Dinosaur Hill, and the Fruita Paleontological area - all are either within or adjacent to the RCBR area.

b. Providing adequate funding support for brochures, educational and interpretive materials.

c. Continued networking between the BLM and the various archaeological, historical, and paleontological interests.

d. Encouraging archaeological, historical, and paleontological resources surveys or inventories in this area, making sure they are locating sites and localities on maps and filling out appropriate site and/or locality forms.

e. Removing archaeologically, historically, and paleontologically sensitive sites and localities from locatable mineral entry through first identifying these resources and then running them through the proper procedure for mineral entry removal.

f. Allowing recreational collecting of fossil wood and common invertebrates so as not to totally deplete the resource in any one area.

g. Identification of archaeologically, historically, and paleontologically sensitive areas in relation to areas still open for locatable mineral entry.

Management Actions:

a. Continue networking with archaeological, historical, and paleontological interests.

b. Continue working under the CMA with the MWC and DIS in assembling an archaeological and paleontological overview of the GJRA (includes the RCBR area).

c. Work with partnerships to educate the public about appropriate uses of archaeological, historical, and paleontological resources. This may involve the use of brochures, exhibits, programs, etc.

d. Maintain interpretive trails in Rabbit Valley, at nearby Dinosaur Hill, and possibly consider one or more new trails either interpreted, or used with a guide (Split Rock, Fruita Paleontologic Site, etc.).

e. Promote use of the GJRA "Fossil Education Kit" and the archaeological education program developed by Anasazi Heritage Center, within and by local community groups.

f. Encourage archaeologists, historians, and paleontologists with existing or potential research interests in the area. This can be done by working closely with them and encouraging them to do quality, permitted, field work and in keeping this process as simple as possible.

3. VEGETATION

Management Objectives:

Manage the northern zone to provide the following desired outcomes:

a. Diverse vegetative communities to enhance ecological processes and provide a mosaic of habitats for wildlife and livestock.

b. Plant communities with minimal levels of cheatgrass.

c. Livestock forage at or above present levels (AUM's) in each grazing allotment.

d. Habitat for antelope, particularly a perennial grass, forb and shrub community.

e. Viable populations of special status plant species.

f. An aesthetically pleasing environment for public land users.

Management Prescriptions:

Deliver the desired outcomes by:

a. Attaining the desired plant community in Appendix E.

Management Actions:

a. Develop activity plans which include grazing strategies that promote the Desired Plant Community.

b. Plan for dormant season use and or spring grazing use that provides periodic rest during critical growth periods.

c. Encourage management practices that decrease the abundance of cheatgrass and increase perennial vegetation. Possibilities include:

- Reseeding of areas following fire.
- Rehabilitation of disturbed areas (unplanned trails, parking areas, campsites, etc.).
- Grazing strategies which minimize overgrazing of perennial vegetation through periodic rest.
- Restrict recreational use to designated areas only.

d. Encourage management practices which create and or maintain diverse vegetative communities for forage and cover. Possibilities include:

- Seed mixtures that compliment the Desired Plant Community.
- Prescribed burns.

e. Use prescribed fire to maintain the mosaic of ecological and vegetative types. The following fire management will apply:

North of I-70 and south of I-70, east of Salt Creek
- Protection of shrub community for wildlife by suppressing all fires.

South of I-70 - west of Salt Creek
- Allow for planned prescribed burns in conformance with the fire management plan. Reseed on a case-by-case basis.

f. Develop partnerships with livestock operators and other users to encourage management that promotes the DPC or other land health goals.

g. Develop tools for educating the public on the ecological processes and the relationship to the diverse uses.

- Pamphlets
- Information Boards
- Packages for School Programs
- Watchable 'Ecology Sites'

4. SOIL, WATER, AIR

Management Objectives:

Manage the northern zone to provide for

a Functioning watersheds

b Protection and/or enhancement of water quality

c Reduction in soil erosion

Management Prescriptions:

Deliver the benefits in this zone by

a Managing for Desired Plant Community objectives

b Maintaining or improving vegetative cover

c Implementing management practices that minimize surface disturbance

d Maintaining air quality standards.

Management Actions:

a Withdraw the Rabbit Valley Research Natural Area, Split Rock Trail, and McDonald Creek Cultural Resource Area from locatable mineral entry.

b Utilize wildlife and livestock grazing strategies that enhance vegetative cover.

c Encourage management practices that reduce the effects of surface disturbance such as rehabilitation of disturbed area, reseeding following fire, implementation of "Best Management Practices", and maintenance of sediment control structures.

5. WILDLIFE AND THREATENED AND ENDANGERED SPECIES

Management Objectives:

Manage the northern zone to provide for:

a The enjoyment of wildlife as part of every visitors experience.

b Measurable harvests of cottontails, mourning doves, and chukars.

c Seventy-five birding recreation days per year (people specifically visiting to find certain birds).

d Security for native wildlife and rare plant populations.

e Confidence that no species listed for Endangered Species Act protection is adversely affected by human actions.

Management Prescriptions:

Deliver the benefits in this zone by adhereing to the following management prescriptions:

a Acclaimed success in rapid education of visitors about species abundances, roles in the community and how to detect their presence.

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b. Developing educational and promotional projects that avoid scare language in reference to wildlife-related hazards and inform about timing, severity, and avoidance tips regarding outdoor pests, and also explain the known environmental roles of these pest species.

c. Increasing visitor ability to identify the rare and the often seen species in the area.

d. Increasing visitor recognition of society's role in maintaining biodiversity; wildlife and rare plant information is presented in the ecoregional context, i.e., the Colorado Plateau, Intermountain Region.

e. Maintaining extensive and accessible inventory and monitoring data.

f. Providing reliable watering sites near small game cover and nesting habitat.

g. Assuring that disturbances to rare plants and animals is minimal and within the limits of toleration by the species.

h. Assuring that habitat suitable for reintroduction of native species that have been locally extirpated, does not acquire uses that eliminate the option to reintroduce the species. Black-footed ferret is example species.

Management Actions:

a. Add wildlife educational messages to the kiosks, outdoor toilets, parking areas, signs, and brochures.

b. Produce 30-second spots to be aired on local TV stations in late March or early April with messages to the potential visitor.

c. Pursue the short-range radio idea with CDOW and tourist agencies to be centered at Exit 2.

d. Publish in the American Birding Association's *Winging it* a write-up on the birding that is available just off I-70 at the west edge of Colorado.

e. To improve the distribution of small game, install six visually obscure water catchments (guzzlers).

f. Produce for public use an annotated checklist of Rabbit Valley wildlife that is actively revised.

g. Protect the two sensitive plant species, *Cryptantha osterhoutii* and *Amsonia jonesii* by vigilantly preventing trail formation near these plants and steering ground disturbing activities away from the sites.

h. Install culverts and, as practical, culvert inserts to provide secure escape shelter for kit foxes in this area of abnormally dense coyote population.

i. All cliffs that are or have been occupied by peregrine falcon eyries will be closed to trail use on the tops and rock climbing from March 15 to July 15. Waive this restriction after April 15 in the years the cliff is unoccupied. Choice of these cliffs for trails and rock climbing at any time of the year will be discouraged.

j. Only small scale, hand-applied use of herbicides and pesticides will be authorized.

k. Open the potential black-footed ferret habitat in the Rabbit Valley area and lands adjacent to the Grand Valley Desert to the north for the establishment of a viable population of black-footed ferrets and cooperate in the release preparation procedures.

B. COLORADO RIVER

1. RECREATION

Management Objectives:

By the year 2000, manage this zone to provide opportunities for visitors to engage in boating (raft, canoe, kayak), day hiking into the lower ends of major canyons, viewing wildlife and waterfowl hunting activities, providing no less than 85% of responding visitors and affected community residents at least a 'moderate' realization of these benefits (i.e. 3.5 on a probability scale where 1= not at all, 2 = somewhat, 3 = moderate, 4 = complete/total realization)

Psychological Experiences (On-site only)

- Meeting desired challenges
- Enjoy risk taking canyon adventures
- Enjoying the closeness of family and friends
- Enjoying learning outdoor recreation & outdoor social skills
- Savoring river canyon aesthetics
- Enjoying reflecting on personal and family values
- Enjoying mental and physical rest

Individual Benefits -- psychological & physiological (most significant)

- Restored mind from unwanted stress
- Greater self-assurance
- Greater outdoor knowledge, skills & self-confidence
- Greater cultivation of outdoor oriented lifestyle
- Increased quality of life
- Greater aesthetic appreciation
- Well informed and more responsible visitors

Household & Community Benefits (most significant)

- Improved functioning of individuals in family and community
- Heightened sense of community pride and satisfaction
- Reduced numbers of at-risk youth
- Maintained and enhanced group cohesion & family bonding
- Greater nurturance of others

Economic Benefits (most significant)

- Well equped customers
- Increased value added to local-regional economy

Environmental Benefits (most significant)

- Greater environmental stewardship

Management Prescriptions: Inputs to Recreation Settings and the Service Delivery System (See Appendix C for a detailed description of each prescriptive class)

Deliver the benefits by maintaining the following diversity of physical, social, and managerial settings

*Physical: The **Land** Resources and Facilities*

Rural -- Front Country -- Middle Country

*Social: The **People** Visitors, Guests & Customers*

Rural -- Front Country -- Middle Country

*Managerial: The **Administrative/Program environment** BLM & Providing Partner Operations*

Rural -- Front Country -- Middle Country

Management Actions for Ruby Canyon:

Resources and Facilities--*Physical Setting*:

In cooperation with Colorado State Parks, help design facilities to be built at the Fruita Recreation Site to overcome the physical limitations of the Loma Launch site

a. At the Fruita Recreation Site cooperate with Colorado State Parks in building the following facilities:

- Boat launch ramp (gravel surface).
- Interpretive exhibits that accurately portray targeted activities and benefit opportunities.

b. Develop interpretive exhibits (incorporating archaeology and wildlife) at the Fruita Recreation Site to help visitors achieve targeted benefits, promote more well-informed and responsible visitors, foster aesthetic appreciation, and to improve outdoor skills and the self-confidence of the visitors.

c. Remove tamarisk at key sites along the river to create new undeveloped camping sites and lunch sites.

d. Develop a watchable wildlife site (in partnership with DOW) at the recently acquired Horsethief property and near the Fruita Recreation Site.

e. Maintain land-based ingress roads and trails into Ruby Canyon at present conditions without improvements.

f. Prohibit motor vehicles and mountain bikes from accessing the river shoreline from the east and west Horsethief benches.

Human Use and Occupancy--*Social Setting*:

a. Inform visitors about the overnight recreational opportunities in Ruby Canyon, including side hikes in the lower one and one-half mile portions of Rattlesnake, Mee and Knowles Canyons and the day-use floating opportunities upstream from Corn Lake to Fruita.

b. Manage the zone, including the lower one and one-half miles of Knowles, Mee, and Rattlesnake Canyons, for an optimum group size not to exceed 25 people to promote the realization of the targeted benefits, to protect the riparian environment and side canyons from overuse by large groups (inside the Black Ridge Canyons WSA).

c. Close portions of the river shoreline to recreational use on a seasonal or other temporary basis to minimize disruption of bald eagles, peregrine falcons, and other sensitive species.

d Visitors may camp at undeveloped campsites on public lands throughout the corridor unless Limits of Acceptable Change (LAC) monitoring indicates a need for directing use and hardening specific sites that were historically used to reduce visitor camping impacts.

e Visitors may do recreational gold panning. Prohibit the use of portable sluicing and dredging devices unless authorized under permit and only if the activity falls within specified limitations.

f Manage the lower one and one-half miles of Knowles, Mee, and Rattlesnake Canyons under the social setting prescription for the Ruby Canyon zone; all remaining portions of Black Ridge West will be managed according to the Black Ridge West social setting prescriptions.

g To promote greater access at launch sites and reduce crowding, parties will be encouraged to unload and move vehicles to designated parking areas within 20 minutes or less.

h Designate, sign, and maintain necessary and favored trails within the river corridor; eliminate and rehabilitate all nonessential social trails radiating from high use sites.

i Encourage "Leave-No-Trace" camping and hiking within the river corridor.

Service Delivery System--*Administrative Setting*:

a Enter into a CMA with the City of Fruita and the Colorado Division of Parks and Outdoor Recreation (DPOR) to jointly manage the Fruita Recreation Site and on-river use.

b Designate the Colorado River corridor between Loma and Westwater as a "Special Area", and compile a business plan and conduct a study on the feasibility of charging all users a fee for the use of the area.

c Continue to pursue acquisition of all key riparian areas to enhance recreational opportunities and improve access.

d Continue to evaluate other additional access sites to the river.

e. BLM welcomes ideas by entrepreneurs for services needed by visitors. Each year the Grand Junction Resource Area will decide using management experience and service provider input if additional services are needed.

f. Develop a comprehensive informational list of service providers and services provided and make them readily available to zone visitors.

g. Direct allocation of river use will only be undertaken after all indirect measures (e.g., including education, information, facility construction to ease pressure off of high-use areas and high-use periods, increasing access to and developing opportunities on the Gunnison River, etc.) are exhausted.

h. BLM and its outfitting service partners will conduct a one-day interpretive seminar for guides on user ethics, available recreation opportunities and area management guidelines.

i. To promote achievement of targeted benefits, both commercial jet boat and personalized water craft operations will be discouraged. See Monitoring, Chapter 6 for management actions that may be employed if levels of motorized water craft on the river reach unacceptable levels.

j. Develop interpretive materials, collaborating with the Grand Valley Natural Resources and Tourism Council, the Grand Valley tourism industry, the City of Fruita, and CDOW, including a waterproof map-brochure geared around the themes: 1. targeted activity and benefit opportunities, 2. targeted settings, and 3. user ethics to help visitors prepare for river conditions: managerial, landowner, and other visitor expectations (including motorized and non-motorized courtesy); resource quality; and 4. high-use periods to be avoided.

k. BLM will increase on-site presence at the put-in locations.

l. Coordinate with the Colorado River State Park and Riverfront Commissions further upstream to encourage visitors seeking shorter trips to use those river segments.

m. Encourage event promoters to consider upstream locations from the Fruita Recreation Site for river-related special events.

n. To promote the achievement of targeted benefits, limit the number of commercial float outfitters to current levels (34), and do not issue additional permits if existing outfitters relinquish their permit.

How the Tourism Industry Can Help:

a Work with the Grand Valley tourism industry, the City of Fruita and area tourism businesses to ensure that all future interpretive and marketing materials explicitly describe the targeted settings, and resulting activity and benefit opportunities.

b Work with the Grand Valley tourism industry and area tourism businesses to inform visitors about the overnight recreational opportunities in Ruby Canyon, including side hikes in the lower one and one-half mile portions of Rattlesnake, Mee and Knowles Canyons and the day-use floating opportunities upstream from Corn Lake to Fruita.

c Ensure that the tourism industry marketing materials accurately reflect the type of preferred use, to promote the achievement of benefits geared at helping visitors "soak-up and capture the area's desirable aesthetics" and to help them "be away from the pressure of encountering too many people" passing in motorized craft.

d Work with the City of Fruita, Grand Valley tourism groups and area tourism businesses to include user ethics messages in their tourism materials that encourage their clients to: 1. be adequately equipped for the river environment and have adequate understanding of how human actions impact it, and 2. promote a responsible use ethic that respects other visitors' experiences, and adjacent landowners and grazing permittees.

e Encourage private sector entrepreneurs to develop commercial area campgrounds in the Loma area to provide overnight accommodations for river (and mountain bike) use.

How Interest and Volunteer Groups Can Help:

a Continue to volunteer time and expertise to assist managers in maintaining recreational facilities and resources.

b Volunteer patrols to help educate peer users.

c Ensure that interest group's initiatives and volunteer patrols are compatible with the zone's overriding management objectives.

2. ARCHAEOLOGIC-HISTORIC-PALEONTOLOGIC

Management Objectives:

Manage the Colorado River to provide for:

a. The protection of archaeologically and historically sensitive sites or localities.

b. The protection of all archaeological and historical sensitive areas with special attention to areas of prescribed fire and planned prescribed burns in conformance with the fire management plan.

c. The collection of scientifically-important archaeological and/or historical objects or fossils (mainly dinosaur bones) by individuals or organizations with proper permits.

d. The collection of fossil wood and common invertebrates by private individuals in reasonable quantities, but done so as not to totally deplete the resource in any one area.

Management Prescriptions:

Deliver the benefits by adhereing to the following management prescriptions:

a. Providing funding/support for brochures and interpretive materials.

b. Continued networking between the BLM and the various archaeological, historical, and paleontological interests.

c. Finishing and later updating the GJRA archaeological, historical, and paleontological overviews, including the RCBR area.

Management Actions:

a. Continue working with partnerships to educate the public about appropriate uses of archaeological, historical, and paleontological resources. This may involve the use of bochures, exhibits, programs, etc.

b Encourage archaeologists, historians, and paleontologists with existing or potential research interests in the area. This can be done by working closely with them and encouraging them to do quality, permitted, field work in the area.

c Finish archaeological and paleontological overviews of GJRA, which will assemble known site and locality data.

d Encourage archaeological, historical, and paleontological resources surveys or inventories in this area, and make sure they are locating sites and localities on standard topographic maps and filling out appropriate site and locality forms and other forms of documentation.

3. VEGETATION

Management Objectives:

Manage the Colorado River to provide for the following desired outcomes:

a The assurance that cottonwood galleries (mature and young) will remain part of the vegetative community along the Colorado River.

b Diverse riparian plant communities providing diverse habitats.

c Native plant communities which are in harmony with a functioning river system.

d Habitat for threatened and endangered species in particular the bald eagle, peregrine falcon and southwest willow flycatcher.

e An aesthetically pleasing environment for recreational users.

Management Prescriptions:

Deliver the desired outcomes by:

a Attaining the desired plant community as described in Appendix E.

Management Actions:

a Manage uses to promote the desired plant community.

b. Grazing Use: Plan for grazing use which:

Assures adequate plant residue is present during high water periods thus protecting river banks, dissipating flood energy and trapping sediment.

Provides for periodic rest during critical growth periods for both herbaceous and woody species when possible.

Where possible utilize grazing as a tool to reduce fuel loads for fire prevention.

c. Recreation Use: Plan for recreational use which:

Minimizes the impacts to the surrounding riparian vegetation.

- Require the use of dead material only for firewood except for tamarisk.
- Encourage the use of tamarisk as firewood.
- Locate campsites away from riparian zone.

Decreases wild fire potential in areas occupied by native plant species particularly cottonwood trees and willows.

- Require the use of fire pans for campfires or a bucket of water for preventative measures in the riparian zone.
- Where appropriate, clear fuels in high fire potential areas.

Minimizes trail activity along riparian areas.

d. Encourages management practices which create and or maintain diverse vegetative communities.

- Utilize seed mixtures that would compliment the desired plant community which rehabilitating disturbed areas.
- Prescribed fire may be utilized to maintain the mosaic of ecological and successional vegetative types.
- Review fires for rehabilitation possibilities.

e. Weed Non-native species control:

Approximately 15 acres of tamarisk control would be done with ground crews lopping tamarisk and painting the stumps with a short-livid

herbicide and planting desirable native riparian woody plants. The shrubs on berms blocking the best river backwater channels would be targeted.

Approximately two acres of knapweed will be plowed prior to seed development and seeded to native warm-season, perennial grass as an experiment and if safe and successful up to five acres would be done.

Only small scale, hand-applied use of herbicides and pesticides will be authorized.

f. Develop tools for educating the public on the ecological processes and the relationship to their diverse uses.

- Pamphlets
- Information boards
- Packages for school programs
- Watchable Ecology Sites

4. SOIL, WATER, AIR

Management Objectives:

Manage the Colorado River to provide for:

a. A functioning floodplain.

b. Stable streambanks.

c. Acceptable air quality.

Management Prescriptions:

Deliver the benefits by:

a. Maintaining or enhancing desirable riparian vegetation along banks and in the floodplain.

b. Maintaining air quality standards.

Management Actions:

a. Minimize recreational impacts to the riparian vegetation.

b. Encourage management practices which create and maintain diverse native vegetative communities.

c. Utilize and/or restrict fire as appropriate to maintain a mosaic of ecological and successional vegetative types.

5. WILDLIFE AND T&E SPECIES

Management Objectives:

Manage the Colorado River to provide for:

a. Enjoyment of wildlife as part of every visitors experience, specifically opportunities for float trip visitors to identify wildlife, notably bald eagles and peregrine falcons.

b. Measurable harvests of cottontails, chukars, and Gambel's quail.

c. One thousand waterfowl hunter days per year.

d. Five hundred fishing days per year.

e. Security for native wildlife and rare plant populations.

f. Confidence that no species listed for Endangered Species Act protection is adversely affected by human actions.

Management Prescriptions:

Deliver the benefits by adhereing to the following management prescriptions:

a. Acclaimed success in rapid education of visitors about species abundances, roles in the community and how to detect their presence.

b. Developing educational and promotional projects that avoid scare language in reference to wildlife-related hazards and inform about timing.

severity, and avoidance tips regarding outdoor pests, and also explain the known environmental roles of these pest species.

c. Increasing visitor ability to identify the rare and the often seen species in the area.

d. Increasing visitor recognition of society's role in maintaining biodiversity. wildlife and rare plant information is presented in the ecoregional context. i.e., the Colorado Plateau, Intermountain Region.

e. Maintaining extensive and accessible inventory and monitoring data.

f. Assuring disturbances to native plants and animals, especially nesting geese and bald eagles, is minimal and within the limits of toleration by the species.

g. Managing for at least one nesting pair of bald eagles and four active peregrine falcon eyries.

h. Providing opportunities to enhance the habitats of native plants and animals.

Management Actions:

a. Add wildlife educational messages to the kiosks, outdoor toilets, parking areas, signs, and brochures.

b. Produce 30-second spots to be aired on local TV stations in late March or early April with messages to the potential visitor.

c. Regularly update information on river access points and the fishing resource to public information specialists.

d. Produce for public use a "Checklist of Wildlife Activities We Can Do on the River."

e. Educate boaters to avoid close approaches to geese from Loma Boat Launch Site downstream to Utah state line in order to prevent nest abandonment.

f. To maintain its suitability for nesting bald eagles, Chow Doggone Island would be closed to camping if it is observed that people are beginning to

camp there. The flammable material below the nest tree will be reduced. This type of response would apply to other locations as the nest site(s) shifts.

g. All cliffs that are or have been occupied by peregrine falcon eyries will be closed to rock climbing from March 15 to July 15. Choice of these cliffs for rock climbing at any time of the year will be discouraged.

h. If it continues to look feasible, a channel on the north side of the river will be dredged to create shallow backwater through a significant span of river heights.

i. To avoid adverse appropriation of lands along the river, continue attempting to acquire the private lands along the river in Horsethief and Ruby Canyons.

C. SOUTH OF THE RIVER

1. RECREATION

Management Objectives for Black Ridge Canyons East – Southern Perimeter and Arches:

By the year 2000, mange this zone to provide opportunities for visitors to engage in viewing of the arches, mountain bike riding and OHV driving activities, providing no less than 85% of responding visitors and affected community residents at least a "moderate" realization of these benefits (i.e. 3.5 on a probability scale where 1 = not at all, 2 = somewhat, 3 = moderate, 4 = complete/total realization):

Psychological Experiences (On-site only)

- Enjoying the closeness of family and friends
- Enjoying viewing and exploring the arches
- Enjoying artistic self-expression
- Enjoying having a tour operator take us to the arches

Individual Benefits -- psychological & physiological (most significant)

- Increased artistic self-expression
- Greater sense of freedom in being able to get to this special place
- Greater visitor satisfaction in being able to do desired trips
- Enhanced sense of place ethic
- Greater community appreciation of the arts
- Greater aesthetic appreciation

Household & Community Benefits (most significant)

- Heightened sense of community pride and satisfaction
- Maintained and enhanced group cohesion & family bonding

Economic Benefits (most significant)

- Satisfied guests
- Improved economic stability from tourism

Environmental Benefits (most significant)

- Improved relationship with the natural world
- Improved community involvement in environmental issues

Management Prescriptions: Inputs to Recreation Settings and the Service Delivery System (See Appendix C for a detailed description of each prescriptive class)

Deliver the benefits by maintaining the following diversity of physical, social, and managerial settings:

*Physical: The **Land**: Resources and Facilities*

Front Country -- Middle Country -- Back Country

*Social: The **People**: Visitors, Guests & Customers*

Front Country -- Middle Country -- Back Country

*Managerial: The **Administrative/Program environment**: BLM & Providing Partner Operations*

Front Country -- Middle Country -- Back Country

Management Actions for Black Ridge Canyons East -- Southern Perimeter and Arches:

Resources & Facilities--*Physical Setting*:

a. The Upper Bench and lower Black Ridge roads will be the primary access routes to the arches. Both routes will be maintained to 4x4 standards. They will be managed alternately to accommodate motorized vehicles using the following seasonal schedules:

The Upper Bench road: Open to all motorized vehicles from April 15th to August 15th only. Open remainder of the year to people on foot, horseback, or mountain bike.

The lower Black Ridge road: Open to all motorized vehicles from August 15th to February 15th only. Open remainder of the year to above activities.

Both routes will be closed to all motorized vehicles during the spring mud season February 15 to April 15 Exceptions include emergency administrative use (search and rescue) and authorized access for grazing permittees Both roads may be temporarily closed at any time to prevent resource damage

b Designate travel routes on the upper bench from the Upper Bench Road

c Improve undeveloped parking area at the intersection of the Glade Park Road and the Black Ridge Road to accommodate visitors who want to ride horses or bike on either road This could include developing an interpretive site and short hiking trail at the old Civilian Conservation Corp location (5ME6894)

d Only if use warrants, and if feasible, construct two trailheads along the Upper Bench Road, and construct hiking trails from them to provide hiking access into the Pollock Canyons-Devils Canyon upland areas If constructed this trail into Devils Canyon may have season closures to protect the desert bighorn sheep

e Develop interpretive exhibits at the parking areas/trailheads to orient visitors to the area, interpret benefits provided, area geology, archaeology history, and ecology, and to promote a special place ethic

f Physically barricade and rehabilitate spur routes off of the lower Black Ridge road

Human Use & Occupancy--*Social Setting*:

a To provide a social setting consistent with the character of the arches the size of groups traveling to the arches will be limited to 12 people through visitor information and education

b Manage for day-use of the area No parking or camping would be permitted along the Ute Trail and no overnight parking would be permitted at the Rattlesnake-Arches Trail Head (see map 9) All backpackers will be required to leave their cars on the upper bench or at the Mee Canyon trailhead

c On-site camping near-vehicles will be prohibited (i e within one-quarter mile of the road) and visitors will be encouraged to use nearby National Park Service U S Fores. Service, and BLM campgrounds

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Service Delivery System--*Administrative Setting*:

a Work with the Grand Valley Natural Resources and Tourism Council to provide descriptive and accurate information about access to the area and available recreation opportunities to current visitors to the area and to help visitors achieve targeted benefits.

b Work with tour operators to provide a diversity of arches tours, including a combination of 4WD, mountain biking, and hiking trips consistent with BLM travel restrictions.

c Provide two familiarization (FAM) tours annually to orient Grand Valley visitor contact and support services personnel to the area.

d Work with local private landowners to identify and sign locations where visitors frequently trespass.

e Issue a Request For Proposals (RFP) to commercial entrepreneurs to diversify the types of float trips available and combination hiking-float trips associated with adjacent Black Ridge Canyon hikes to accommodate a growing demand for a variety of benefits.

f Develop a comprehensive informational list of service providers and services provided and make them readily available to visitors.

***How the Tourism Industry Can Help*:**

a Work with the Grand Junction Visitor and Convention Bureau (VCB) and area tourism businesses to ensure that all future promotional materials explicitly describe the targeted settings, and resulting activity and benefit opportunities for this zone.

b Market the wilderness, and the diversity of experiences as a national and regional attraction.

c Work with the Grand Junction VCB and area tourism businesses to include user ethics messages in their promotional materials that encourage their clients to: 1) be adequately equipped for the desert environment and have adequate understanding of how human actions impact it, and 2) promote a responsible use ethic that respects other visitors' experiences, and adjacent landowners and grazing permittees.

How Interest and Volunteer Groups Can Help:

a. Continue to volunteer time and expertise to assist managers in maintaining recreational facilities and resources.

b. Volunteer patrols to help inform, educate and assist users.

c. Ensure that interest group initiatives are compatible with the zone's overriding management objectives.

Management Objectives for Black Ridge Canyons East -- Pollock Canyon Complex:

By the year 2000, manage this zone to provide opportunities for visitors to engage in day hiking and mountain bike riding activities, providing no less than 85% of responding visitors and affected community residents at least a 'moderate' realization of these benefits (i.e. 3.5 on a probability scale where 1 = not at all, 2 = somewhat, 3 = moderate, 4 = complete/ total realization).

Psychological Experiences (On-site only)

- Enjoying frequent access to a range of physical challenge
- Enjoying easy access to diverse primitive and unconfined outdoor recreation environments
- Enjoying learning about man's influence on the natural world and its potential beneficial influence on individuals, society, and the economy (Devils Canyon)
- Savoring river canyon aesthetics
- Escaping everyday responsibilities for awhile
- Releasing or reducing some built up mental tensions
- Appreciating knowing others are nearby for social interaction and risk reduction

Individual Benefits -- psychological & physiological (most significant)

- Improved sense of control over one's life
- Improved understanding of how involvement in natural settings builds character
- Improved understanding of rural-urban interface
- Improved understanding of Wilderness

- Greater scholarship and a more positive mental attitude about learning
- Greater freedom from urban living
- Greater environmental awareness and sensitivity

Household & Community Benefits (most significant)

- Increased opportunity for affiliation with others
- Increased social support

Economic Benefits (most significant)

- Increased work productivity

Environmental Benefits (most significant)

- Improved relationship with the natural world
- Improved land stewardship

Management Prescriptions: Inputs to Recreation Settings and the Service Delivery System (See Appendix C for a detailed description of each prescriptive class)

Deliver the benefits by maintaining the following diversity of physical, social, and managerial settings.

*Physical: The **Land** Resources and Facilities*

Rural -- Front Country -- Middle Country -- Back Country

*Social: The **People** Visitors, Guests & Customers*

Front Country -- Middle Country -- Back Country

*Managerial: The **Administrative/Program environment** BLM & Providing Partner Operations*

Rural -- Front Country -- Middle Country -- Back Country

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Management Actions for Black Ridge Canyons East -- Pollock Canyon Complex:

Resources and Facilities--*Physical Setting:*

a. Manage the following lands as additions to the Black Ridge Canyons Wilderness Study Area: 200 acres of land in Devils Canyon, 280 acres of land in Flume Canyon. Lands recognized as non-suitable additions to the Black Ridge Canyons WSA include: 440 acres in Devils Canyon and 40 acres in Flume Canyon.

b. Develop a foot and horseback loop trail into the Pollock Canyon and Flume Canyon upland areas.

c. During the WSA interim management period, mountain biking will be allowed to continue on the Pollock Bench Trail. BLM and adopt-a-trail volunteers will continue to monitor mountain bike use on the trail. Bike use may be prohibited if unacceptable resource impacts are occurring.

d. Develop a Devils Canyon Outdoor Classroom at the mouth of Devils Canyon consisting of a series of nature trails, a natural amphitheater (i.e., taking advantage of existing landscape terrain), and a restroom to accommodate school groups.

e. Develop parking area for the Devils Canyon Outdoor Classroom and trailhead at the mouth of Devils Canyon for the existing trail to the head of the canyon.

f. Develop a single-track mountain bike loop in the non-wilderness portion of Devils Canyon.

g. Manage Devils Canyon to reduce impacts to desert bighorn sheep. Discourage hiking beyond cabin or in side canyons, and rock climbing during spring lambing season (April 1 - June 1).

h. Change travel management status from "open to existing roads and trails" to "open to designated routes only" from Kodels Canyon to Pollock Canyon.

i. Manage Flume, Devils and Kodels Canyons area for non-motorized use only.

j. Manage Flume Canyon for hiking and equestrian use only.

k. Rehabilitate acquired lands in Devils Canyon by removing unneeded structures and facilities.

Human Use & Occupancy--*Social Setting:*

a. Manage the zone primarily for day-use recreation but also let people know about back country camping opportunities (all will be undesignated) within the area and in other portions of the Black Ridge Canyons WSA.

b. Manage the zone for an optimum group size not to exceed 12 to 15 people to promote the realization of the targeted benefits.

c. Establish a "no-shooting zone" (hunting still allowed) in Kodels and Devils Canyons between the river southwest of Fruita and the Pollock Bench Trailhead to provide visitor safety. (See map 9, page 5-52.)

Service Delivery System--*Administrative Setting:*

a. Develop an environmental education program at the Devils Canyon Outdoor Classroom collaboratively with School District 51, DIS, Grand Junction Department of Social Services, the CDOW, the Department of Outdoor Recreation and local neighborhood associations (including Kings View Estates).

b. Adopt an aggressive "Leave No Trace" visitor information outreach program to stimulate a wilderness ethic among zone visitors.

c. Work with commercial entrepreneurs/outfitters to identify the need for guided back-country hiking trips, shuttle service for hikers in the area, etc.

d. Enlist the services of DIS (and the Devils Canyon Science and Learning Center) and the MWC to provide guided interpretive tours and non-guided interpretation of the Fruita Paleontological Site and Dinosaur Hill, coordinated with the Devils Canyon Outdoor Classroom.

e. Coordinate with the CDOW and the Bureau of Reclamation to consolidate state and federal lands to improve manageability of public lands in the zone (BLM manage areas south of main Horsethief Canyon access road and Bureau of Reclamation/CDOW manage areas north of the main Horsethief Canyon access road).

f. Implement a permit-system for mountain bikers using the Pollock Bench Trail. The permit system would be in partnership with COPMOBA and local bike shops. The permits would provide information to the users about the WSA, user ethics, and help BLM monitor user number and visitor experiences/benefits.

How the Tourism Industry Can Help:

a. Work with the Grand Junction VCB and area tourism businesses to ensure that all future promotional materials explicitly describe the targeted settings, and resulting activity and benefit opportunities for this zone.

b. Market the area's diverse recreation opportunities as a national-regional attraction. (Ensure that the mountain bike opportunities on Pollock Bench Trail are not promoted on a regional or national basis.)

c. Work with the Grand Junction VCB and area tourism businesses to include user ethics messages in their promotional materials that encourage their clients to: 1. be adequately equipped for the desert environment and have adequate understanding of how human actions impact it, and 2. promote a responsible use ethic that respects other visitors' experiences, and the rights of adjacent landowners and grazing permittees.

How Interest and Volunteer Groups Can Help:

a. Continue to volunteer time and expertise to assist managers in maintaining recreational facilities and resources.

b. Volunteer patrols to help educate peer users.

c. Ensure that interest group initiatives are compatible with the zone's overriding management objectives.

Management Objectives for Black Ridge Canyons West:

By the year 2000, manage this zone to provide opportunities for visitors to engage in wilderness backpacking and big game hunting activities, providing no less than 85% of responding visitors and affected community residents at least a "moderate" realization of these benefits (i.e. 3.5 on a probability scale where 1 = not at all, 2 = somewhat, 3 = moderate, 4 = complete/total realization).

Note: This and other planned management restrictions are portrayed on the map on the following page.

Mapscale 1:170000

Map 9. Recreation Management Restrictions

- Designated Route Areas
- No Shooting Areas
- No Overnight Camping
- No Overnight Vehicle Camping
- Public Lands Within the Planning Area

Psychological Experiences (On-site only)

- Meeting desired challenges
- Enjoy risk-taking canyon adventure
- Improving skills
- Testing your endurance
- Feeling good about being isolated & independent
- Savoring wilderness aesthetics
- Enjoying reflecting on personal and family values

Individual Benefits -- psychological & physiological (most significant)

- Improved physical fitness/better health maintenance
- Greater overall sense of overall wellness
- Renewed human spirit
- Improved self-reliance
- Improved outdoor knowledge, skills and self confidence
- Greater cognitive efficiency
- Enhanced sense of freedom
- Greater environmental awareness and sensitivity

Household & Community Benefits (most significant)

- None

Economic Benefits (most significant)

- None

Environmental Benefits (most significant)

- Greater environmental stewardship

Management Prescriptions: Inputs to Recreation Settings and the Service Delivery System (See Appendix C for a detailed description of each prescriptive class)

Deliver the benefits by maintaining the following diversity of physical, social, and managerial settings:

*Physical: The **Land**: Resources and Facilities*

Front Country -- Middle Country -- Back Country -- Primitive

*Social: The **People**. Visitors, Guests & Customers*

Back Country -- Primitive

*Managenal: The **Administrative/Program environment**. BLM & Providing Partner Operations*

Front Country -- Back Country -- Primitive

Management Actions for Black Ridge West:

Resources & Facilities--*Physical Setting*:

a. Manage the lower one and one-half miles of Rattlesnake, Mee, and Knowles Canyons along Ruby Canyon primarily for river-related day hiking and the remainder of the WSA for backpacking.

b. Manage the following lands as additions to the Black Ridge Canyons Wilderness Study Area: 290 acres in two separate areas along the Colorado River.

c. Construct and designate a parking area and trailhead at the intersection of the Black Point Road and Mee Canyon Trail.

d. The road west of Mee Canyon trailhead will be gated to reduce trespass onto privately-owned lands and control vehicles in the wilderness study area.

e. Maintain hiking trails from trailheads along the BS Road on the south to the Jones Canyon Overlook and into (but not through) Knowles Canyon.

f. To enable visitors to get into the canyon bottoms, help them avoid private property trespass, and to minimize off-trail resource impacts, do some minimal trail construction and mark the following trails with cairns:

   From Mee Canyon Trailhead to access Mee Canyon.

   In Rattlesnake Canyon from the river to the arches.

g. Mark major trails with cairns, as needed to delineate routes, and maintain signs, appropriate to the targeted physical setting and as provided for in the Wilderness Act to provide for user safety, trail identification, and protection of the land.

h. Allow for natural recovery of all other double-track and single-track trails except the Colorado Ridge Road, the Mee Canyon Trail, and the Knowles Canyon Bench Road (see under Human Use and Occupancy below).

i. Provide interpretive kiosks at the Mee, Knowles, and Jones Canyons Trailheads.

j. Prohibit overnight camping on the bench below and the mesa top above the arches.

Human Use and Occupancy--Social Setting:

a. Gate the Colorado Ridge Road at its intersection with the Arches Road, the Mee Canyon Trail (at the trailhead), and the Knowles Canyon Bench Road (at its intersection with the Boundary Road) to all motorized use except for authorized motorized use by grazing permittees.

b. Manage the zone for an optimum group size not to exceed six to 10 people to promote realization of targeted benefits (excluding the lower one and one-half miles of Knowles, Mee, and Rattlesnake Canyons which are under the Ruby Canyon social management prescription) to promote achievement of targeted benefits.

c. Encourage "Leave No Trace" hiking and camping within the area. The Leave No Trace program will be implemented throughout the area.

Service Delivery System--*Administrative Setting:*

a. Issue an RFP as needed to identify commercial entrepreneurs to provide the specific kinds of services needed for wilderness backpacking visitors to realize targeted benefits.

How the Tourism Industry Can Help:

a. After formal wilderness designation, work with the Grand Junction VCB and area tourism businesses to ensure that all future tourism materials explicitly describe the targeted settings and activity and benefit opportunities targeted for this zone.

b. Work with the Grand Junction VCB and area tourism businesses to include user ethics messages in their tourism materials that encourage their clients to: 1. be adequately equipped for the desert environment

and have adequate understanding of how human actions impact the WSA, and 2. promote a responsible use ethic that respects other visitors' experiences, and the rights of adjacent landowners and grazing permittees.

How Interest and Volunteer Groups Can Help:

a. Continue to volunteer time and expertise to conduct volunteer patrols to help maintain the character of the Black Ridge West wilderness experience.

2. ARCHAEOLOGIC-HISTORIC-PALEONTOLOGIC

Management Objectives:

Manage the southern zone to provide for:

a. Protection of archaeologically and historically sensitive sites or localities with special attention to areas of PNF and planned prescribed burns in conformance with the fire management plan. Reseed case by case.

b. Protection of all archaeologically, historically, and paleontologically sensitive sites and localities in areas still open to locatable mineral entry.

c. The collection of scientifically-important archaeological and/or historical objects or fossils (mainly dinosaur bones) by individuals or organizations with proper permits.

d. The collection of fossil wood and common invertebrates by private individuals in reasonable quantities, but done so as not to totally deplete the resource in any one area.

e. Archaeological, historical, and paleontological resource surveys or inventories of the area, both within and outside the WSA. Ensure that sites and localities are located on standard topographic maps with appropriate site or locality forms and other documentation.

f. Promote use of the GJRA "Fossil Education Kit" and the archaeological education program developed by Anasazi Heritage Center, within and by local community groups.

Management Prescriptions:

Deliver benefits by adhering to the following management prescriptions:

a. Providing funding/support for brochures and interpretive materials.

b. Continued networking between the BLM and the various archaeological, historical, paleontological and wilderness interests.

c. Finishing and later updating the GJRA archaeological and paleontological overviews, including the RCBR area.

d. Encourage archaeological, historical, and paleontological resources surveys or inventories in this area, both within and outside the WSA. Ensure they are locating sites and localities on standard topographic maps and filling out site and/or locality forms, and other documentation.

Management Actions:

a. Continue working under a CMA with the MWC and DIS, in assembling a paleontological overview of the GJRA, which includes the RCBR area.

b. Continue networking with paleontological, archaeological, and wilderness interests.

c. Work with community - brochures, etc.:

Through partnership feedback
Compliance checks
Through BLM paleontological resources program
BLM Fossil Education Kit use
Sign-in registers at Dinosaur Hill Rabbit Valley
Trail Through Time, etc.
Questionnaires

d. Continue to work in the CMA with the MWC and DIS for proper management of paleontological resources in this area, and to involve other partners as needed.

e. Work with partnerships to educate the public about appropriate uses of archaeological, historical, and paleontological resources. This may involve the use of brochures, exhibits, programs, etc.

f. Encourage archaeologists, historians, and paleontologists with existing or potential research or educational interests in the area by working closely with them and encouraging them to do permitted field work and in keeping this process as simple as possible.

g. Finish archaeological and paleontological overviews of GJRA, which will assemble known locality data.

3. VEGETATION

Management Objectives:

Manage the southern zone to provide for the following desired outcomes:

a. Diverse vegetative communities to enhance ecological processes and provide a mosaic of habitats for wildlife and livestock.

b. Native plant communities.

c. Livestock forage at or above present levels (AUMs) in each grazing allotment.

d. Habitat that favors deer and not elk. A browse component is desired for deer habitat especially in critical deer range along the Utah border (SWA 60).

e. Bighorn sheep habitat particularly pinyon-juniper densities appropriate for migration routes.

f. Viable populations of special status plant species.

g. A natural environment for public land users.

Management Prescriptions:

Deliver the desired outcomes by:

a. Attaining the desired plant community for the Colorado River as described in Appendix E.

b. Allow fire, natural or human ignited, to function as a natural process as much as possible.

Management Actions:

a. Utilize grazing strategies that plan for dormant season use and/or spring grazing use which provides periodic rest during critical growth periods.

b. Continue livestock agreements, eliminating livestock use in certain canyon bottoms and sheep use in desert bighorn ranges.

c. Utilize management activities that favor maintaining or creating deer habitat and discourages elk use of the area.

d. Reseed qualifying areas following fire to promote the desired plant community, mainly diversity and reduce the potential for invasion of cheatgrass or other undesirable vegetation. Rehabilitation would be on a case by case basis depending on fire size, suitability of soils and slopes, and availability of a natural seed source etc. Seed mixtures would only include native species and should include shrubs and forbs.

e. Fire management activities should consider the following:

- Allowing fire to play as natural role as possible by following the guidelines in the Prescribed Natural Fire Plan.

- Encourage diversity and consider the shrub component for deer habitat.

- Utilizing fire to open up areas within the pinyon-juniper community type for desert bighorn sheep movement, especially in the west portion of the unit.

- Limiting total acres burned to 15 to 20 percent of Black Ridge unit in a given year. These percentages are guidelines only and should be evaluated each year.

- Utilizing prescribed burns to maintain or achieve the desired plant community.

- An annual meeting with the DPC Team and other interested parties to evaluate the role of fire in meeting resource objectives including the desired plant community.

f. Initiate eradication measures if goldenrod proves to be an alien invader.

g. Utilize herbicides, pesticides and biological agents on a small scale basis for the control of weeds and/or exotic species.

h. Develop partnerships with livestock operators and other users to encourage management that promotes the DPC or other land health goals.

i. Develop tools for educating the public on the importance of ecological processes and the relationship to the diverse uses.

4. SOIL, WATER AND AIR

Management Objectives:

Manage the southern zone to provide for:

a. Functioning watersheds.

b. Protection and/or enhancement of water quality.

c. Reduction in soil erosion.

d. Acceptable air quality.

Management Prescriptions:

Deliver the benefits by:

a. Managing for desired plant community objectives.

b. Maintaining or improve vegetative cover.

c. Maintaining minimum air quality standards.

Management Actions:

a. Utilize wildlife and livestock grazing strategies that enhance vegetative cover.

b. Encourage management practices that reduce the effects of surface disturbance such as rehabilitation of disturbed areas, reseeding following fire, controlling the size of fires and implementation of Best Management Practices.

c. Maintain minimum air quality standards.

5. WILDLIFE AND T&E SPECIES

Management Objectives:

Manage the southern zone to provide for:

a. Enjoyment of wildlife part of every visitors experience.

b. At least five 3/4 curl or greater sized desert bighorn rams observable in population per year.

c. At least four hundred mule deer hunter-days per year.

d. At least 150 elk hunter-days per year.

e. Security for native wildlife and rare plant populations.

f. Wildlife habitat approximating pristine conditions.

g. Confidence that no species listed for Endangered Species Act protection is adversely affected by human actions.

h. A population of desert bighorn sheep of between 125 and 535 animals with a lamb/ewe ratio of at least 25 percent in late summer or early fall (refer to Appendix A - Desert Bighorn Plan).

Management Prescriptions:

Deliver the benefits by adhering to the following management prescriptions:

a. Acclaimed success in rapid education of visitors about species abundances, roles in the community and how to detect their presence.

b. Developing educational and promotional projects avoid scare language in reference to wildlife-related hazards and inform about timing, severity, and avoidance tips regarding outdoor pests and potentially hazardous species, and also explain the known environmental roles of these species (gnats, rattlesnakes).

c. Increasing visitor ability to identify the rare and the often seen species in the area.

d. Increasing visitor recognition of society's role in maintaining biodiversity. Wildlife and rare plant information is presented in the ecoregional context, i.e., the Colorado Plateau, Intermountain Region.

e. Maintaining extensive and accessible inventory and monitoring data.

f. Provide reliable watering sites near bighorn sheep escape cover.

g. Managing for a post hunting season buck/doe ratio of 25 percent in GMU 40.

h. Managing for a post hunting season bull:cow ratio of 20 percent in GMU 40.

i. Assuring that disturbances to bighorn sheep, and rare plants and animals is within the limits of toleration by the species.

Management Actions:

a. Add wildlife educational messages to trailheads and brochures.

b. Produce 30-second spots to be aired on local TV stations in April and May with messages to the potential visitor.

c. Produce for public use a checklist of wildlife known to be in the Black Ridge WSA with revisions as needed.

d. Management action dealing with the management of desert bighorn sheep is addressed in the revised Colorado Desert Bighorn Sheep Management Plan, Appendix A.

e. To protect desert bighorn sheep, discourage hiking in Devils Canyon during the spring lambing season (April 1 though June 1).

f. Support the CDOW in encouraging a high harvest rate of deer, elk, and if research indicates its advisable, mountain lions in this area for a reduced competition, disease transmission and predation on the desert bighorn sheep population.

g. Helicopter access to peregrine eyrie sites and desert bighorn sheep handling sites will be allowed until the WSA is designated as wilderness.

h. All cliffs that are occupied by peregrine falcon eyries will be closed to trail use on the tops and rock climbing from March 15 to July 15 and over the same period, all cliffs that have ever been occupied by peregrine falcons eyries will be closed to rock climbing. Choice of these cliffs for trails and rock climbing at any time of the year will be discouraged.

CHAPTER 6

Monitoring and Evaluation Plan

The GJRA will conduct informal evaluations of monitoring data and resource conditions on an annual basis, and will report evaluations to the Ruby Canyon/Black Ridge interdisciplinary core team and the Ad-hoc Committee and any other interested agency or public. Interested agencies or public individuals or groups may participate in this evaluation or meeting. Should the evaluation reveal unacceptable conditions, a formal evaluation will be initiated.

Formal evaluations will be conducted every five years to coincide with the resurvey of RCBR visitors or in the event that informal evaluations by the interdisciplinary core team reveal unacceptable conditions. Formal evaluations will be conducted by the full core team and will include the following items:

1. Documentation of management actions that have been implemented.

2. Documentation of the existing condition of any specific indicators and standards.

3. Monitoring data analysis to determine if plan objectives are being met or trend is toward meeting the objectives. If objectives are not being met or the trend is away from meeting the objectives, new management actions will be recommended.

4. New issues will be analyzed to determine if they are within the scope of the existing objectives. Management actions will then be analyzed to determine if they adequately address the issue.

5. Newly developed management actions identified for implementation will become plan revisions or amendments. Plan amendments will be subject to additional environmental review (NEPA) and will be available for public review for 30 days before a decision is made to implement the action(s).

The following outlines the specific monitoring that will be conducted for each resource.

RECREATION

Environmental and social management standards have been established through the Limits of Acceptable Change (LAC) process and public participation. LAC is a process for establishing acceptable and appropriate conditions and will govern the management strategy for RCBR area. LAC is based on the premise that change to the ecological and social conditions of an area will occur as a result of natural and human factors. The goal of management is to keep the character and the rate of change due to human factors within acceptable levels and consistent with the identified physical, social and managerial settings as well as the objectives of the plan.

The primary emphasis of the LAC system is on the conditions desired, rather than on how much use an area can tolerate, i.e., the social carrying capacity. The management challenge is not one of how to prevent any human-induced change, but rather one of deciding what change should occur, how much change will be allowed, what management actions are needed to guide and control it and how the managing agencies and partners will know when the established limits are being or have been reached.

While carrying capacities have not been established for key areas in the RCBR ecosystem, i.e., the river corridor, the mechanics of the LAC system alert the managing agencies to unacceptable change before it is too late to react and more restrictive actions must be put into place. For each value to be monitored, one or more key indicators are selected which allow the managing agencies to track that aspect of the ecosystem or social setting. For each indicator, a standard is set. This is the threshold value which determines the amount of change that will be accepted. The standards serve as "triggers" which cause predetermined management actions to be implemented.

The LAC process is designed to be the foundation for the long-term protection and enhancement of the targeted objectives in the RCBR area. The following tables outline the key indicators, management standards, potential management actions as well as monitoring that will be conducted.

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RECREATIONAL Monitoring
Indicators, Standards and Actions for North of the River Zone

Value to be Maintained or Enhanced	Key Indicators	Management Standard	Management Actions if Standard(s) are not met (in preferred order of implementation)	Sampling Method/ Frequency
Physical Setting Land and Facilities	1. Nearness to/distance from roads 2. Amount of Developed Facilities	Mary's & Lum's Loop Rabbit Valley Riding Area 1. Near to on 4WD roads, at least 1/2 mile from all maintain roads 2. A few primitive facilities such as trails & signs Trail Through Time 1. On or near primary highway 2. Moderate # of facilities to manage use McDonald Creek, Wolfmilk & Rabbits Ear Mesas 1. At least a 1/2 mile from all roads 2. Very few to no facilities	1. Remove of unnecessary and or redundant signs 2. Closure and rehabilitation of unauthorized travel routes	Inventory of location of all roads, trails and facilities in relation to the recreation management zone Annually
Social Setting Human Use and Occupancy	Contacts with other people - Number of encounters per day with other groups	Mary's & Lum's Loop Rabbit Valley Riding Area 80% chance of encountering no more than 15 other groups per day in "Middle Country" zone Trail Through Time 80% chance of encountering no more than 20 other groups per day in the "Rural" zone McDonald Creek, Wolfmilk & Rabbits Ear Mesas 80% chance of encountering no more than 10 other groups per day	1. Initiate high visibility patrols & information & education program 2. Charge a use/entrance fee 3. Require use permit on trail & or areas (non-rim) 4. Restrict number of groups using the area & or trail at any one time	BLM and volunteer patrols of key motorized and non-motorized trails, minimum of 12 survey patrols per year per trail

RECREATIONAL Monitoring
Indicators, Standards and Actions for North of the River Zone (Cont.)

Value to be Maintained or Enhanced	Key Indicators	Management Standard	Management Actions if Standard(s) are not met (in preferred order of implementation)	Sampling Method/ Frequency
Managerial Setting Service Delivery System	Amount of on the ground visitor management	Where It Currently Exists Wapiti Valley, Rubey Area Wallingford Loops, Wolfcreek & Rabbits Ear Moraine A few subtle visitor management controls and information facilities present Into The Future On site controls and infopoints numerous and easy to see	Removal of unnecessary or redundant management controls and/or information facilities	Inventory of number and location of visitor management controls and information facilities Annually
Activity Opportunities Preferred	Degree of preference for targeted activity opportunities	85% of visitors reporting that they still desire to participate in the targeted activities specified for this zone	To be determined and prescribed after resurvey results	Resurvey visitors every 5 years
Activity Opportunity Participation	Ability to participate in targeted activity opportunities	High degree of ability for visitors to engage in targeted activity opportunities	Evaluate information brochures to determine if they are explicitly portraying targeted activity opportunities, amend as needed	Annual analysis based on field observations, visitor register data etc.
Benefit Opportunities Preferred	Degree of preference for targeted benefit opportunities	85% of visitors reporting at least a "moderate" preference for targeted benefit opportunities	To be determined and prescribed after resurvey results	Resurvey visitors every 5 years

RECREATIONAL Monitoring
Indicators, Standards and Actions for North of the River Zone (Cont.)

Value to be Maintained or Enhanced	Key Indicators	Management Standard	Management Actions if Standard(s) are not met (in preferred order of implementation)	Sampling Method/ Frequency
Achievement of Benefit Opportunities	Ability to realize the following on-site psychological experiences: Wow & Awe Factor Meeting desired challenges Enjoy risk-taking canyon adventure Enjoying strenuous physical exercise Testing your endurance Quickly accessing natural resource environments Enjoying frequent exercise Savoring river canyon aesthetics Escaping everyday responsibilities for awhile Releasing built up mental tensions Keeper Living Rating Rule Quickly accessing natural resource environments Enjoying frequent exercise Enjoying frequent access to a range of physical challenge Enjoying the closeness of family and friends Enjoying group outdoor events Enjoying learning outdoor recreation & outdoor social skills Escaping everyday responsibilities for awhile	80% of responding visitors reporting being able to at least moderately able (3.0 on a probability scale with 1 = not at all able to 4 = fully able) to achieve the benefit opportunities.	Management actions will be prescribed from resurvey results. Resurvey will determine the setting attributes that support the achievement of benefits and establish linkages in the benefit chain of causality. Managers will use indirect and direct measures to meet standard.	Resurvey visitors every 5 years.

RECREATIONAL Monitoring
Indicators, Standards and Actions for North of the River Zone (Cont.)

Value to be Maintained or Enhanced	Key Indicators	Management Standard	Management Actions if Standard(s) are not met (in preferred order of implementation)	Sampling Method/ Frequency
Achievement of Benefit Opportunities	Ability to realize the following on-site psychological experiences For Through Trip · Enjoying meeting new people having similar interests · Enjoying directed experiential learning about immediate ecology and area geology · Enjoying viewing/admiring on-site/ distant forms of your own or their natural setting Multi-Use/Close Attachment & Mobility For Whole · Quickly accessing natural resource environments · Enjoying frequent exercise · Enjoying closeness of family & friends · Discovering contemplating man's relationship with the land · Enjoying exploration · Enjoying learning about earlier cultures · Enjoying refuge from and role of aesthetics · Savoring area refuge/ country aesthetics · Escaping everyday responsibilities for awhile	80% of responding visitors reporting being able to at least moderately attain (3/5 on a probability scale with 1 = not at all able to 4 = totally able) to achieve the benefit opportunities	Management actions will be prescribed from resurvey results resurvey will determine the setting attributes that support the achievement of benefits and establish linkages in the benefit chain of causality. Managers will use indirect and direct measures to meet standard : If the resurvey shows that benefit opportunities are not being achieved, the setting prescriptions may be changed to a class that better reflects the targeted benefits	Resurvey visitors every 5 years Conduct focus group interviews

Other monitoring actions for North of the River Zone

- Annually monitor high use trails and campsite areas for unacceptable resource damage
- Annually compile data from all trail registration stations and traffic counters
- Annually monitor and evaluate the application of information marketing materials to determine if they explicitly describe the benefit opportunities

RECREATIONAL Monitoring
Indicators, Standards and Actions for Colorado River Zone

Value to be Maintained or Enhanced	Key Indicators	Management Standard	Management Actions if Standard(s) are not met (in preferred order of implementation	Sampling Method/ Frequency
Physical Setting Land and Facilities	1. Nearness to/distance from roads 2. Amount of Developed Facilities	1. At least 1/2 mile from all improved roads 2. A few primitive facilities such as bars & signs but hardly noticeable	1. Removal of unnecessary and or redundant signs 2. Closure and rehabilitation of unauthorized river routes	Inventory of location of all roads and trails in relation to the recreation management zone Annually
Social Setting Human Use and Occupancy	Contacts with other people - Number of encounters per day with other groups	80% chance of encountering no more than 10 other groups per day on the river	1. Initiate high visibility patrols and information and education program 2. Charge a use/entrance/launch fee 3. Limit overnight use, designate campsites or visitation permit with a fee 4. Encourage early launch times 5. Reduce allowable party size to 25 (not including guides) 6. Limit total overnight use to 20 parties per night 7. Limit the number of water craft per group to no more than 12 8. Require staggered launch times for all parties 9. Restrict the number of parties using the river at any one time - allocation system only during peak use period April - October 31	BLM and volunteer river patrols (minimum of 12 runway patrols per year)
Managerial Setting Service Delivery System	Amount of on the ground visitor management	A few visible visitor management controls and information facilities present	Removal of unnecessary or redundant management controls and/or information facilities	Inventory of number and location of visitor management controls and information facilities Annually

RECREATIONAL Monitoring
Indicators, Standards and Actions for Colorado River Zone (Cont.)

Value to be Maintained or Enhanced	Key Indicators	Management Standard	Management Actions if Standard(s) are not met (in preferred order of implementation	Sampling Method/ Frequency
Activity Opportunities Preferred	Degree of preference for targeted activity opportunities	85% of visitors reporting that they will desire to participate in the targeted activities specified for this zone	To be determined and prescribed after resurvey results	Resurvey within seven years
Activity Opportunity Participation	Ability to participate in targeted activity opportunities	High degree of ability for visitors to engage in targeted activity opportunities	Evaluate information brochures to determine if they are exposing or missing targeted activity opportunities; amend as needed	Annual analysis based on field observations and/or register data on
Benefit Opportunities Preferred	Degree of preference for targeted benefit opportunities	85% of visitors reporting at least a moderate preference for targeted benefit opportunities	To be determined and prescribed after resurvey results	Resurvey within seven years

RECREATIONAL Monitoring
Indicators, Standards and Actions for Colorado River Zone (Cont.)

Value to be Maintained or Enhanced	Key Indicators	Management Standard	Management Actions if Standard(s) are not met (in preferred order of implementation)	Sampling Method/ Frequency
[illegible]	[illegible]	[illegible]	Management actions will be prescribed from resurvey results (resurvey will determine the setting attributes that support the achievement of benefits and establish linkages in the benefit chain of causality. Managers will use indirect and direct measures to meet standard. If the resurvey shows that benefit opportunities are not being achieved, the setting prescriptions may be changed to a class that better attains the targeted activities and the facilitation of targeted benefits.	[illegible]
[illegible]	[illegible]	[illegible]	1. Restrict size of motors allowed on motorized water craft 2. Allow motorized watercraft on the river only on select use periods 3. Prohibit motorized watercraft entirely during the primary boat season	[illegible]
[illegible]	[illegible] [illegible]	[illegible] of visitors reporting that campsites in satisfactory condition, not a problem or problem, but a type 3 or 4 problem, is a very serious problem. No more than 20% loss of vegetation within campsites	1. Close a portion of the camp areas in use to allow for natural regeneration of vegetation 2. Close entire camp area in use and rehabilitate impact areas	[illegible] Measure thinning of vegetation in August of every even-numbered year

RECREATIONAL Monitoring
Indicators, Standards and Actions for Colorado River Zone (Cont.)

Value to be Maintained or Enhanced	Key Indicators	Management Standard	Management Actions if Standard(s) are not met (in preferred order of implementation)	Sampling Method/ Frequency
People on the river	Users indicating problem	80% of visitors reporting that the number of people on the river is acceptable, not a minor problem, on a scale of not a problem to a very serious problem	1. Initiate high visibility patrols and information and education program 2. Charge a use/entrance/launch fee 3. Limit overnight use, assigned campsites in advance, permit with a fee 4. Encourage early launch times 5. Reduce allowable party size to 25, not including guides 6. Limit total overnight use to 20 parties per night 7. Limit the number of water craft per group to no more than 12 8. Require staggered launch times for all parties 9. Restrict the number of parties using the river at any one time - allocation system only during peak use period April - October 31	Resurvey visitors every 5 years
Campfires/fire rings	Users indicating problem	80% of visitors reporting that camp fire rings are not a minor problem, on a scale of not a problem to a very serious problem	1. BLM will increase patrols and put in presence to educate users and enforce regulations 2. Seasonal, summer restrictions on campfires 3. Require visitors to bring their own firewood 4. Allow wood fires only in designated sites. Take fire rings in those areas 5. Protect wood fires within corridor, require the use of stoves and charcoal grills	Resurvey visitors every 5 years
Litter and human waste	Users indicating problem	80% of visitors reporting that litter and human waste is not a minor problem, on a scale of not a problem to a very serious problem	1. Increase the number of cleaning patrols to every two weeks 2. Education awareness program for the upstream communities	Resurvey visitors every 5 years

Other Economic pictures for the Colorado River Zone

Annually monitor and evaluate the application of recreation marketing numbers to determine if they explicitly describe the benefit opportunities

RECREATIONAL Monitoring
Indicators, Standards and Actions for South of the River Zone

Value to be Maintained or Enhanced	Key Indicators	Management Standard	Management Actions if Standard(s) are not met (in preferred order of implementation)	Sampling Method/ Frequency
Physical Setting Land and Facilities	1. Nearness to Distance from roads 2. Amount of Developed Facilities	Southern Perimeter & Arches 1. Near or on 4WD roads, but at least 1/2 mile from an improved road. 2. A few primitive facilities such as trails & signs but hardly noticeable Porous Canyon Complex 1. At least 1/2 mile from all roads = Backcountry Setting. Near or on 4WD roads = Front Country 2. A few primitive facilities such as trails & signs but hardly noticeable Black Ridge Canyons West 1. At least 1/2 to 3 miles from all roads 2. A few primitive facilities such as trails and signs - very few - "Primitive" Setting	1. Removal of unnecessary and or redundant signs 2. Closure and rehabilitation of unauthorized travel routes	Inventory of location of all roads and trails in relation to the recreation management zone Annually
Social Setting Human Use and Occupancy	Contacts with other people - Number of encounters per day with other groups	Southern Perimeter & Arches 80% chance of encountering no more than 10 other groups per day = 6 around the Arches Porous Canyon Complex 80% chance of encountering no more than 15 other groups per day in the "Backcountry" setting	1. Initiate high visibility patrols & information & education program 2. Charge a use/entrance fee 3. Require use permits for trail & or areas monitoring 4. Restrict number of groups using the area & or trail at any one time	BLM and volunteer patrols (average of 12 survey patrols per year in Key Trails, Arches, Rattlesnake Canyon, Porous Bench an

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RECREATIONAL Monitoring
Indicators, Standards and Actions for South of the River Zone (Cont.)

Value to be Maintained or Enhanced	Key Indicators	Management Standard	Management Actions if Standard(s) are not met (in preferred order of implementation)	Sampling Method/ Frequency
Rangerial Setting Service Delivery System	Amount of on the ground visitor management	Southern Perimeter & Arches Visitor management controls noticeable but harmonize with the landscape Fiery Canyon Complex Visitor management controls and information facilities easily noticeable in "Front Country" setting. A few subtle controls and facilities in "Backcountry" setting Rock Ridge Canyons West No on site visitor management or information facilities	Removal of unnecessary or redundant management controls and/or information facilities	Inventory of number and location of visitor management controls and information facilities Annually
Activity Opportunities Preferred	Degree of preference for targeted activity opportunities	80% of visitors reporting that they still desire to participate in the targeted activities specified for this zone	To be determined and prescribed after resurvey results	Resurvey visitors every 5 years
Activity Opportunity Participation	Ability to participate in targeted activity opportunities	High degree of ability for visitors to engage in targeted activity opportunities	Evaluate information brochures to determine if they are explicitly portraying targeted activity opportunities (should as needed)	Annual analysis based on field observations, visitor register data etc.
Benefit Opportunities Preferred	Degree of preference for targeted benefit opportunities	80% of visitors reporting at least a "moderate" preference for the targeted benefit opportunities	To be determined and prescribed after resurvey results	Resurvey visitors every 5 years

RECREATIONAL Monitoring
Indicators, Standards and Actions for South of the River Zone (Cont.)

Value to be **Maintained** or Enhanced	Key Indicators	**Management Standard**	**Management Actions if Standard(s) are not met (in preferred order of implementation)**	**Sampling Method/ Frequency**
Achievement of Benefit Opportunities	Ability to realize the following on-site psychological experiences Southern Perimeter & Ashes Enjoying the closeness of family and friends Enjoying viewing and exploring the arches Enjoying artistic self-expression Enjoying having a tour operator take us to the arches Arches Canyon Complex Enjoying frequent access to a range of physical challenge Enjoying easy access to diverse primitive & unconfined outdoor recreation environments Enjoying learning about man's influence on the natural world Escaping everyday responsibilities for awhile Releasing built-up mental tensions Appreciating knowing others are nearby for social interaction and risk reduction Rock Ridge Cirque vs West Meeting distinct challenges Enjoy risk-taking canyon adventure improving skills Testing your endurance Savoring wilderness aesthetics Enjoying reflecting on personal and family values	80% of responding visitors reporting being able to at least moderately able (3.0 on a probability scale with 1 = not at all able to 4 = totally able) to achieve the benefit opportunities	Management actions will be prescribed from resurvey results. Resurvey will determine the setting attributes that support the achievement of benefits and establish linkages in the benefit chain of causality. Managers will use indirect and direct measures to meet standard. If the resurvey shows that benefit opportunities are not being achieved the setting prescriptions may be changed to a class that better reflects the targeted benefits.	Resurvey visitors every 5 years Conduct focus group interviews

Other monitoring activities for South of the River Zone:

1. Visitor use will be monitored through direct, on-site observations (i.e. numbers, types of use, and biophysical impacts) and through continued interviews and resurveys.

2. A traffic counter will be maintained on the Ute Trail to assist in monitoring visitor use numbers.

3. Visitor registration stations will be maintained at the Rattlesnake Arches and Mee Canyon trailheads. A year-end monitoring report will be compiled to summarize use levels and user characteristics. Use of trail registers at Knowles and Jones Canyons Trailhead will be initiated if use warrants.

4. Periodic patrols will be conducted on the road to the Arches to assess impacts from users in designated camp areas, day use sites and parking areas.

5. Photo monitoring stations will be maintained at the Arches, Mee Cave and along trails to assess changing resource conditions.

ARCHAEOLOGIC-HISTORICAL-PALEONTOLOGICAL

Monitoring for adverse impacts to archaeological, historical and paleontological resources will be conducted by maintaining and updating a database of cultural and paleontologic resources information from all of the management zones within the RCBR Plan. The following tables outline the details of the monitoring for each of the three resources by zone. Known sites (prehistoric, historical and paleontologic) should be photo documented every one to three years in order to keep a visual as well as recorded log of any damage to these resources, caused by natural or human actions. This monitoring will be done by BLM specialists (archaeologist, geologists and paleontologist), with the assistance from other BLM staff and law enforcement personnel. Additional assistance will be obtained from the various partners that work with the BLM such as the MWC and DIS. As BLM personnel work in the area, they should be previously trained in cultural and paleontological awareness and should check for visual damage to these resources when doing other resource specialty work. Any potential damages will then be brought to the attention of the specialist.

Perceived damage to the cultural or paleontological resources will be assessed by use of the databases, previous photos, and law enforcement input, as applicable. If damage is greater than what is allowed by law, RMP standards, interim guidance for WSAs, in partnership agreements, other BLM policy, and beyond the limits of this planning effort, then alternate management actions will be studied and proposed in order to better protect prehistoric, historical and paleontological resources.

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ARCHAEOLOGY AND HISTORICAL Monitoring
Indicators, Standards and Action for Ruby Canyon Black Ridge Planning Area

Value to be Maintained or Enhanced	Management Prescriptions	Key Indicator	Management Standard	Potential Management Actions if Standards Are Not Met	Methods/ Frequency/ Participants
Preserve cultural resources	Implement RMP and archaeological overview information	Observed rate of degradation to sites features and isolated finds especially in river/rim along the river corridor	Continue to increase site data base and protect sites free from erosion vandalism theft and other forms of destruction Meet specific RMP and other objectives involving cultural and historical resources	Encourage management practices to decrease non-permitted actions from erosion natural human grazing practices fire etc consumptive activities potentially damaging management practices fire control grazing Map perform intent surface sites and test excavate damaged areas of buried cultural and historical deposits including processing of samples for radiocarbon tables pollen etc Increase public in the area and educate increased enforcement measures and pamphlet especially in Mt Emmit Creek area and important riverfront and rock shelter sites along the river	M a periodically visit and maintain photo record of sites most vulnerable b continue to educate the public in preservation c encourage law enforcement to help watch for problems degradation d train other BLM employees in archaeology as awareness needs F a every 5 years b ongoing c annually and inform after each registered in term d annual seminar Managers with training every 5 yrs

PALEONTOLOGY Monitoring
Indicators, Standards and Action for Ruby Canyon Rlack Ridge Planning Area

Value to be Maintained or Enhanced	Manage-ment Presc-ription	Key Indicator	Management Standard	Potential Management Actions if Standards Are Not Met	Methods/ Frequency/ Participants

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VEGETATION

The vegetative landscape goal for the Ruby Canyon planning area is the DPC description (Appendix E). It was developed by a group consisting of internal BLM personnel, grazing permittees, state wildlife officials, bighorn sheep interests, recreationists, environmentalists and other interested public as an agreed upon vegetative description of the planning area. Specific objectives relating to vegetation correspond to the DPC descriptions.

Monitoring of the DPC will occur at various levels and time frames. The baseline data for the DPC was an ESI completed in 1994. This inventory describes the landscape in terms of species composition, production and seral stage. To directly monitor the status of the DPC another inventory would have to be done. This would allow for direct comparison of the species composition and seral stages. Reinventory of the entire plannig area would be expensive but reinventory on a small scale basis would be feasible and undertaken on an as needed basis. The DPC can be monitored in an indirect manner through the use of other monitoring methods. Established frequency transects within individual grazing allotments can provide data that can indirectly be correlated to the DPC. Frequency transects describe the vegetation in percent frequency which is not directly comparable to DPC but can be indirectly evaluated. Objectives from specific activity plans which relate to frequency can be evaluated against the DPC. Frequency monitoring is ongoing through the resource area monitoring plan and provides a means of monitoring the DPC in shorter time frames than the ESI. Other monitoring such as land status and wildlife browse studies can also be indirectly evaluated against the DPC.

An important aspect of monitoring is to not only monitor our progress towards attaining the DPC but to continuously evaluate whether our DPC meets the objectives of the BLM and public land users. The DPC may require modification based upon changes in land use goals or mistakes in the initial description. This phase of the monitoring should be performed jointly with the DPC team and other newly identified interested parties. This could include annual meetings of the DPC team and/or public surveys.

VEGETATION Monitoring
Indicators, Standards and Action for North of River Zone

Value to be Maintained or Enhanced	Management Prescriptions	Key Indicator	Management Standard	Potential Management Actions if Standards Are Not Met	Methods/Frequency/ Participants

VEGETATION Monitoring
Indicators, Standards and Action for Colorado River Zone

Value to be Maintained or Enhanced	Manage-ment Presc-riptions	Key Indicator	Management Standard	Potential Management Actions if Standards Are Not Met	Methods/Frequency/ Participants
Diverse Riparian Communities	Meet ORC	Presence of different plant community types	Maintain the mosaic and diversity of plant community types	Management actions applied will depend upon and be keyed to the determination of the activity influencing the standard. Refer to Chapter 5 for specific management actions in relation to influences (activity)	M - Level II Inventory Riparian Transects F - 10 Years P - BLM ORC Team, Interested Public
Native Plant Communities	Meet ORC	Domination by exotic species or noxious weeds	Reduce the areas (SMAs) dominated by exotic species and/or noxious weeds	Same as above	Same as above
Cottonwood galleries	Meet ORC	Presence of mature and young cottonwoods	Maintain the number of areas (SMAs) containing mature cottonwoods or cottonwood regeneration	Same as above	Same as above continued
Aesthetic enjoyment of riparian areas	Meet ORC	Presence of above indicators	Maintain the above standards	Same as above	M - User survey F - Every 5 years P - Users and Interested Public
Habitat for T&E species	Meet ORC	Trend of population levels of T&E species	Maintain habitat for T&E species	Limit uses or influences affecting the habitat of T&E species	M - Plant status inventory F - Every 5 years P - BLM staff, F&WS, Interested Public

VEGETATION Monitoring
Indicators, Standards and Action for South of River Zone

Value to be Maintained or Enhanced	Manage-ment Presc-riptions	Key Indicator	Management Standard	Potential Management Actions if Standards Are Not Met	Methods/Frequency/ Participants
Diversity among and within plant communities Native Plant Communities	Alton DPC	Plant Diversity Seral Stages Annual vegetation	Maintain 60 - 80% of the acreage in each ecological site in DPC units Meet specific objectives from activity plans Reduce levels of annual vegetation particularly cheatgrass	Allow fire to play as natural role as possible Utilize prescribed burns to achieve diversity Reseed certain areas following disturbances such as fire to promote DPC Improve Grazing Strategies to favor perennial vegetation	M - a. Photo Points b. Frequency Transects c. ES d. Land Status F - a & b - 5 years, identified in Range Monitoring Plan c & d - 10 years P - BLM, Permittee, DPC Team, Interested Public
Sustain Increase AUM's for sensitive use	Alton DPC	Rangeland Condition & Trend	Manage for stable or upward trend. Trend would be based upon site specific objectives	Utilize grazing strategies that plan for dormant season use and/or periodic rest from spring use Improve livestock distribution Utilize fire, mature or prescribed, to achieve DPC and/or objectives	M - Photo Points Frequency Transects F - 5 years, identified in Range Monitoring Plan P - BLM, Permittee, Interested Public
Deer Habitat	Alton DPC	Shrub Community	Maintain shrub community in critical winter range (SBB-60) and as identified in DPC for other areas	Utilize fire management which encourages diversity and the shrub component Reseed disturbed areas with seed mixtures that include native shrubs and forbs Utilize management actions that broaden critical winter range	M - Photo Points Frequency Transects Browse Age Class Transect F - identified in Range Monitoring Plan P - BLM DOW, Permittee, Interested Public
Bighorn Sheep Habitat	Alton DPC	Juniper naturally crown	Maintain open atmosphere in the Foothill Juniper Ecological Site	Utilize fire to open areas for sheep migration	M - Aerial photos F - 15 years P - BLM DOW

VEGETATION Monitoring
Indicators, Standards and Action for South of River Zone (Continued)

Value to be Maintained or Enhanced	Manage-ment Presc-riptions	Key Indicator	Management Standard	Potential Management Actions if Standards Are Not Met	Methods/Frequency/ Participants
Natural environment	Man-DPC	Presence of above indicators	Monitor the above standards	All of the above	M Visitor surveys F Every 5 years P Visitors and Interested Public
Viable populations of T&E plant species	Man-DPC	Presence of T&E plant species	Maintain or enhance current populations of T&E plant species	Discontinuance or adjustments of uses influencing presence of specified plants	M Plant Status Inventory F Every 5 years P BLM staff, Plant Interested Public

SOIL, WATER AND AIR

Many of the soil and water objectives are associated with water quality and erosion which are directly influenced by recreation, livestock and wildlife management activities. Any activity that results in an increase in vegetative cover will benefit the water cycle, improve water quality and reduce erosion. As such, monitoring to assure DPC, fire management, recreation, forage, and habitat objectives are met, will provide much of the data needed to assure water and soil resources are not compromised. Of particular interest are the vegetative composition, bare ground and litter component correlated with acceptable limits of soil loss and water quality standards. These data should be analyzed on a five year cycle by a watershed specialist or hydrologist. If the management objectives are not being met as indicated by the monitoring data, the objectives will be revisited to determine they are realistic, and the management for the area will be assessed to determine the source of the undesirable impacts.

A North of the Colorado River

Continue monitoring as outlined in the Grand Valley Watershed Management Plan.

B Colorado River

Photographs will be taken at permanent photo points and at a set frequency to determine changes in vegetative communities and recreational impacts to the riparian zones.

C South of the Colorado River

Collection and interpretation of cover and vegetation data which will be used as an indicator of watershed health.

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Soil and Water Monitoring
Indicators, Standards and Action for North and South of the River Zone

Value to be Maintained or Enhanced	Management Prescriptions	Key Indicators	Management Standards	Potential Management Actions of Standards Are Not Met	Methods/Frequency/ Participants
[illegible]	Manage for desired plant community objectives Maintain or improve vegetative cover Implement management practices that minimize surface disturbance	Bare ground Lack of desirable vegetation Formation of rills Litter less than present Pedestaling evident	Mining no formation of areas capable of supporting vegetation, mining pedestaling, gully, rill accumulation	Wildlife and livestock grazing strategies that enhance vegetative cover Management practices that reduce the effects of surface disturbance, some examples include: -rehabilitation of disturbed areas -reseeding following fire -controlling the size of fires -implementation of Best Management Practices -maintenance of sediment control structures -controlling intensity and timing of activities	Frequency data interpreted for bare ground, Photo plot interpretation, Ranked data with a bare ground, litter component, repeat 5% Frequency - 5 years Data collected by rangeland management - clerks or technicians and analyzed by watershed specialists or hydrologic technicians
[illegible]	Manage for desired plant community objectives Maintain or improve vegetative cover Implement management practices that minimize surface disturbance	Known water quality	Compliance with the Clean Water Act and/or the Colorado River Basin Salinity Control Act	Same as above	Annual analysis of water quality data collected by USGS WDR and other agencies with supplemental data collected by the hydrologist. Data should be analyzed by the hydrologist every 5 years

Soil and Water Monitoring
Indicators, Standards and Action for River Corridor

Value to be Maintained or Enhanced	Manage-ment Prescr-iptions	Key Indicator	Management Standard	Potential Management Actions if Standards Are Not Met	Methods/Frequency/ Participants
State of in-stream banks	Maintain or enhance desirable riparian vegetation along banks and in the floodplain	Presence of diverse, abundant riparian vegetation Minimal presence of exotic species or invasive weeds	Streambanks protected with native riparian vegetation Maintenance of a good mosaic of diverse, desirable plant communities	Minimize recreation impacts to the riparian vegetation Encourage management practices which create and maintain diverse native vegetative communities Create and/or restrict fire to maintain a mosaic of ecological successional vegetative types	Follow-up riparian inventory, permanent photo plots Frequency every 3 years Data collection and analysis by a riparian coordinator, hydrologist, or rangeland specialist
Functioning floodplain	Maintain or enhance desirable riparian vegetation along banks and in the floodplain	Minimal damage to floodplains formerly high flow periods	Streambanks and flood plains protected with native riparian vegetation	Same as above	Same as above

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WILDLIFE AND THREATENED AND ENDANGERED SPECIES

Achievement of the management objectives, is the primary concern of land managers, yet it is often easier to monitor the conditions thought necessary to get those objectives, the management prescriptions. However, when the prescriptions are known to have been achieved, land managers may be fooled by it into the unnecessary conclusion that the objectives have been met. Therefore, the monitoring of wildlife and T&E species targets a mix of prescriptions and objectives. In the process it might be discovered that some objectives are obtained in spite of what we do.

Several measures to monitor other resources also help assess the meeting of wildlife and T&E species objectives. With a couple of lines added to recreation's public questionnaire, wildlife and T&E species objectives are sampled. Every objective under the vegetation section and the soil, air, and water section is an objective for wildlife and, to a lesser extent, the rare plants of the Ruby Plan area. Therefore, the monitoring methods in other sections, that most directly survey the listed wildlife and T&E species objectives, are referenced in this section. Also in the vegetation section specific references are made to wildlife habitat objectives.

Due to the variety of conditions needed for healthy wildlife populations and security for rare species, and for the human enjoyment of them, many skills are required to monitor these resources. In addition to the Area Manager, the following have monitoring duties in this section: CDOW, USF&WS, and of BLM--the wildlife biologist, natural resource specialist for rare plants, recreation specialist, ecologist, and the engineering technician.

Note that the North of the River Zone overlaps with the area of the Grand Valley Habitat Management Plan. The issues, objectives, and the monitoring relevant to this overlap have been carried across to this plan.

Wildlife and T & E Species Monitoring
Indicators, Standards and Action for North of the River Zone

Value to be Maintained or Enhanced	Manage-ment Prescr-iptions	Key Indicator	Management Standard	Potential Management Actions if Standards Are Not Met	Participants/ Methods/ Frequency/
[illegible]	[illegible]	[illegible]	One every 5 years	Contact an I&E consultant to assess our products and advice	Area Manager, Recreation and Wildlife Specialists/continual observation
	[illegible]	[illegible]	No council rules without positive rules	Brochure...not imposed rules	Area Manager, Wildlife Biologist/continual observation
	[illegible]	[illegible]	Detectable statistically significant change	Contact an I&E consultant to assess our techniques and make and perhaps implement recommendations	Area Manager, Recreation Specialist/Resurvey of visitors every 5 year
	[illegible]	[illegible]	Average less than 10 minutes monthly type information request	Investigate time bottlenecks and attempt to correct them	Wildlife Biologist/continual observation
[illegible]		[illegible]	At least one hunter per year reporting in area	Analyze reasons with CDOW of few hunters or low report rate	a. Recreation Specialist/sign in sheet/continual b. CDOW annual hunters report
	[illegible]	[illegible]	To sustain even dry from drought	Increase apron or enlarge size of gutters	Engineering Technician/Maintenance inspection every 5 years
[illegible]		[illegible]	One organized herding per year	Expand advertising	Wildlife Biologist/continual observation
[illegible]	Same as for Diversity under Vegetation Monitoring				
	Same as for Habitat under Vegetation Monitoring				
	[illegible]	[illegible]	No reduction not explainable by the weather	Change trails to reduce erosion, explore seed harvesting and plants	Ecologist, Wildlife Biologist hand plot every five 5 years

Wildlife and T & E Species Monitoring
Indicators, Standards and Action for North of the River Zone (Continued)

Value to be Maintained or Enhanced	Manage-ment Prescr-iptopms	Key Indicator	Management Standard	Potential Management Actions if Standards Are Not Met	Participants/ Methods/ Frequency/
Protection for T&E species		Peregrine fledglings	Average number/nest site equals at least 1.7	Increase monitoring to determine causes of poor performance	CDOW signs watch annual
	Maintained habitat for locally extinct species	Prairie dog dens	Active dens remain healthy or fluctuate with the Grand Valley population	Investigate causes; close trails that appear responsible	USF&WS den count every 5 years

Wildlife and T & E Species Monitoring
Indicators, Standards and Action for the Colorado River Zone

Value to be Maintained or Enhanced	Management Prescriptions	Key Indicator	Management Standard	Potential Management Actions if Standards Are Not Met	Methods/Frequency/ Participants
Enjoyment of wildlife and fishing		Visitor response	20% minute information on sight obtained	Analyze responses and craft new public outreach	Recreation and Wildlife Specialists Monitor [illegible] every 3 years
Enjoyment of wildlife	Noted success in visitor education	Same as in North of the River Zone:			
	Information giving respect for wildlife	Same as in North of the River Zone:			
	Improved visitor knowledge	Same as in North of the River Zone:			
	Large and accessible database	Same as in North of the River Zone:			
Measurable harvests of small game and security for native birds	Diverse riparian communities	Same as for Diverse Riparian and for Native Plant Communities in Vegetation Monitoring			
Secure and adequate harvest of waterfowl	Minimized disturbance of native species	Goose nesting	At least one successful nest or pair At least two broods detectable from Lake Launch site to the mouth of any day in May	Post the left river bank in the first three miles of Moosehall Canyon from Lake Launch site	[illegible] each year 7 days per visit

Wildlife and T & E Species Monitoring
Indicators, Standards and Action for the Colorado River Zone

Value to be Maintained or Enhanced	Manage-ment Prescr-iptions	Key Indicator	Management Standard	Potential Management Actions if Standards Are Not Met	Methods/Frequency/ Participants
Mink man 100 km sq (Bald Mt. area)		Fishing trips	100 per year	Discuss with CDOW the limiting factor: resource access, other	CDOW/Fishing surveys/annual
Security for native species especially T&E species	Cottonwood galleries	Same as cottonwood galleries and vegetation monitoring			
	Mink and otter marine to one native species	Bald eagle fledglings	At least 1 per year	Close Drive Goggins Island to camping where this not cause	CDOW field watch 5 days per year
		Rare fish population	Upward trend over next 10 year period	Cooperate with FWS, pursue the side channel dredge proposal	USFWS fish sampling/3 times per year
		Other native species indicators T&E species	No simultaneous actual or historical peregrine nest sites from Mar 15 to July 15 or reported adverse impacts identified in nest survey	Institute restrictions targeting identified problems such as rock climbing in designated areas only or by permit only within 1 mile of the Colorado River or permanent closure of trails where the hazard is occurring	Recreation Specialist or climbing use register 15 Mar to 30 July/annual

Wildlife and T & E Species Monitoring
Indicators, Standards and Action for South of the River Zone

Value to be Maintained or Enhanced	Management Prescriptions	Key Indicator	Management Standard	Potential Management Actions if Standards Are Not Met	Methods/Frequency/ Participants
[illegible]	Same as the first 4 Inputs and Monitoring under North of the River Zone				
[illegible]		Big ram numbers	Progress toward 5 per year		CDOW/hunter report annual
	Same as for Sustain/Increase AUMs for livestock under vegetation Monitoring				
	Same as for Bighorn Sheep Habitat under vegetation Monitoring				
	Reliable water sites near escapes	Bighorn distances from water	No area farther from water than 2.5 mile	Put in more water developments	CDOW/aerial mapping of entered mixed/2 times per year
	Alpine population estimate	Bighorn population numbers and lamb/ewe ratio	1:, 12:, 12:, and 25	If less than 10 reduce input of resources to this herd. If less than 10 but less than 12/ maximize effort to increase herd. If more than 12/ increase harvest to lower the population	CDOW counting by ratio flights/1 year
	Mineral and disturbance to native species	Lambing sites	40% stable	Increase bear controls	CDOW/aerial survey/1 per year
[illegible]		Number of deer hunters	400 hunter days		CDOW/hunter checks and reports year
	Deer population estimates numbers	Buck:Doe ratio	More than 25 percent		CDOw
[illegible]		Elk taken	More than 110 per year		CDOW/hunter checks and reports year
	Elk population estimates numbers	Bull:cow ratio	More than 25 percent		CDOW

Wildlife T & E Species Monitoring
Indicators, Standards and Action for South of the River Zone (Continued)

Value to be Maintained or Enhanced	Management Prescriptions	Key Indicator	Management Standard	Potential Management Actions if Standards Are Not Met	Methods/Frequency/ Participants
[illegible]	Same as for Diversity among plant communities in vegetation Monitoring				
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Same as for Deer Habitat and Vegetation Monitoring				
[illegible]		Peregrine fledglings	Same as in North of the River Zone		
		Pine Lumbing	Same as in North of the River Zone		

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CHAPTER 7

Collaborative Management Strategy and Funding

1. Partnership Management Roles

As outlined on page 3-2, the implementation of this plan is dependent on a collaborative management strategy involving three primary partners: 1) Public Land Managers, 2) Recreation-Tourism Industry, and 3) Local Residents and their Governments. Each of these partners has a role to play in assuring that the management objectives outlined in Chapter 5 are achieved. These roles and responsibilities are listed on pages 3-2, 3-3, and 3-4.

2. Cooperative Management Agreements

There are already several CMA in place that will help facilitate the implementation of this plan. They are as follows:

A. Recreation Management of the Loma Boat Launch - CMA between BLM and CDOW to share in the management of the Loma Boat Launch site (toilet maintenance costs, signs etc.).

B. Maintenance and Planning for Grand Valley Mountain Bike Trails - CMA between BLM and COPMOBA to cooperate in the maintenance of existing mountain bike trails and expansion of mountain bike trail systems. Currently six trails in the RCBR planning area have been "adopted" by various bike shops and businesses in Grand Junction and Fruita.

C. Grand Valley/Rabbit Valley OHV Areas - A CMA between BLM and the Motorcycle Trail Riders Association to coordinate in the organization of volunteer projects, maintaining signs and developing interpretive materials. Most of the work takes place in Rabbit Valley.

D. Management of Significant Paleontological Areas - The purpose of this CMA is for BLM, MWC, and DIS to manage the paleontological resources at the Rabbit Valley Research Natural Area, the Fruita Paleontological Area, and Dinosaur Hill. All of these areas lie within the RCBR planning area.

E. Fruita Paleontologic Area of Critical Environmental Concern - The purpose of this CMA is to recognize the importance of the Fruita Paleontologic site and the need for special management to protect its scientific values. It is a joint agreement between the BLM and the Colorado Natural Areas Program.

Other CMAs may be needed with other agencies and organizations to better facilitate the achievement of benefits as outlined in this plan.

3. Types and Sources of Funding/Revenue

Funding for the implementation of this plan will not rely solely on the BLM budget. BLM funds will be leveraged as much as possible in combination with the following sources:

- Colorado Natural Areas Program (research grants, etc.)
- Greater Outdoors Colorado direct grants
- Colorado State lottery grants
- Partners such as MWC, DIS, municipalities, other agencies, organizations and private landowners

GLOSSARY

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GLOSSARY

AUM Animal Unit Month - The amount of forage required to sustain a cow and a calf for one month.

BBM Benefits Based Management - An expanded conceptual framework for on-the-ground management of recreation-tourism leisure services. "Benefits" under the BBM framework are changes that are viewed to be advantageous or improvements in condition to individuals, to groups, to society, or even to another entity such as endangered species; the prevention of worse conditions; and the realization of desired and satisfying on-site psychological experiences.

BLM Bureau of Land Management

CDOW Colorado Division of Wildlife

CMA Cooperative Management Agreement

CNM Colorado National Monument

COPMOBA Colorado Plateau Mountain Bike Trail Association

DIS Dinamation International Society

DPC Desired Plant Community - A description of a plant community which meets the needs for present and future uses of a particular area

ESI Ecological Site Inventory - An intensive vegetative inventory that describes the present vegetative communities in an area.

GJRA Grand Junction Resource Area - BLM office responsible for managing the Ruby Canyon/Black Ridge Area.

IMP Interim Management Policy - BLM's policy and guidelines for managing wilderness study areas.

LAC Limits of Acceptable Change - A recreation management planning system that requires managers to define desired biophysical and social/psychological conditions and to undertake actions to maintain or achieve these conditions.

MTRA Motorcycle Trail Riders Association

MWC Museum of Western Colorado

NPS National Park Service

PNF Prescribed Natural Fire - Natural fires caused by lightning that are allowed to burn within certain prescribed parameters.

RCBR Ruby Canyon/Black Ridge - Planning area that is encompassed by this plan.

RMP Resource Management Plan - The land use plan that sets overall management direction for the Grand Junction Resource Area.

ROS Recreation Opportunity Spectrum - A planning process that provides a framework for defining classes of outdoor recreation environments, activities and experience opportunities that are arranged along a spectrum ranging from pristine to highly developed environments.

SWA Site Writeup Area - Numbered areas that have been inventoried as to the composition and make up of their vegetation.

VCB Visitor and Convention Bureau - For the City of Grand Junction.

WSA Wilderness Study Area - Areas being managed by the BLM for possible inclusion into the National Wilderness Preservation System

APPENDIX A

DESERT BIGHORN SHEEP PLAN

COLORADO DIVISION OF WILDLIFE DESERT BIGHORN SHEEP MANAGEMENT PLAN

BLACK RIDGE HERD UNIT REVISION

Prepared by:
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Colorado Division of Wildlife
Terrestrial Wildlife Section
Grand Junction, Colorado

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MANAGEMENT PLAN PLANNING TEAM MEMBERS

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INTRODUCTION

In 1989 the Colorado Division of Wildlife (CDOW) and the Bureau of Land Management (BLM) approved a restoration management plan for desert bighorn sheep in Colorado (CDOW and BLM 1989). This plan was developed to coordinate the establishment of self-sustaining desert bighorn sheep populations in western Colorado.

The 1989 management plan provided broad management guidelines for its implementation. It established population and habitat management objectives for each sheep herd along with the current land use management decisions, monitoring activities, planned actions and coordinated guidelines with other resource programs.

This plan is a revision of the 1989 management plan for the Devils-Mee Canyon unit, which has been renamed the Black Ridge herd to better define the herd's geographic range. The revised plan is a joint effort of the CDOW, BLM and Colorado National Monument (NPS).

Since the original management plan was completed in 1989, the restoration of desert sheep in the Black Ridge unit has not developed as anticipated. It was anticipated sheep transplanted during the initial reintroductions would populate all suitable range from within the Colorado National Monument to the Colorado state line and support a self-sustaining herd. During the late 1980s and early 1990s, it was determined by CDOW that the population had not extended its range west of Mee Canyon. It also appeared that population numbers were not increasing as predicted. The herd was expected to number about 170 animals by 1995; however, estimates ranged from 50 to 100 sheep in 1995.

Four separate transplants of desert bighorn sheep have been made to established the herd. Three are considered to be founder herd transplants and took place in 1979, 1980 and 1981. Another transplant took place during October, 1995 with the objective of extending the range of the established herd. Initially, efforts were made to transplant sheep from the existing Black Ridge herd. This transplant approach failed when suitable trap sites could not be found. An alternate transplant plan was initiated, which involved trapping and transplanting sheep from another state. A request for sheep was made from CDOW to the Nevada Division of Wildlife. This project included an environment assessment which was completed by the Grand Junction Resource Area of the BLM for the proposed release. The NPS provided funds for this trap and transplant project.

Additional interest in restoring a desert bighorn sheep population occurred during 1995. The NPS indicated an interest in renewing efforts to establish a herd that would inhabit the Colorado National Monument.

This interest from the CNM, as well as heightened public concern about the desert bighorn herd and its management in the Black Ridge area, confirmed to the agencies involved that it would be appropriate to update this section of the 1989 management plan. It was noted that the plan's development would benefit by more public involvement in the decision-making process.

In October of 1995, action was taken to update the Black Ridge desert bighorn sheep management plan. A desert bighorn sheep

working group was formed in order that public interests would be represented in development of the management plan. The working group was composed of various interested individuals who represented a cross section of public and private groups, concerned citizens and landowners. The plan's development would be accomplished in a manner consistent with BLM and WPS rules, guidelines and regulations and would be adopted as a subsection of or an appendix to the BLM Ruby Canyon Management Plan.

This management plan applies only to the desert bighorn population within the identified herd unit boundary. If the wild sheep population expands beyond the present boundary, then this plan will not apply to that portion of the population outside the herd unit. If this type of expansion occurs, then a revision of this plan or a new plan will be necessary.

BLACK RIDGE HERD STATUS

The current number of desert bighorn sheep in the Black Ridge herd is difficult to determine. Accurately estimating numbers of animals in a free-ranging population is one of the most difficult problems facing wildlife managers. Census techniques are expensive and usually require that a portion of the population be marked in some manner. Often estimates are based on the minimum number of animals known to be alive in a population at a particular time. Minimum numbers may be determined by helicopter sex/age classification surveys and both intensive and extensive ground surveys. The minimum number is simply an enumeration of all the known sheep in the population.

Current estimates for this herd range from 50 to 75 sheep. The population estimates are based on several different indices including classification surveys (helicopter sex and age surveys), aerial and ground counts, and hunter harvest success.

The CDOW conducts classification surveys to obtain information regarding the age and sex structure of the population (Table 1). Surveys are usually conducted by helicopter. This information provides a minimum number of known animals observed during the survey. It also provides data on lamb survival and lamb recruitment into the adult population as well as data on distribution and movements. The sex/age ratios presented in the table are shown as the number of rams and lambs per 100 ewes.

Currently, there is concern that the Black Ridge desert bighorn population is not growing and expanding its range as anticipated. The short-term objective established in the original management plan in 1989 was to have a population of 170 animals by 1995. This population size has never been reached. Both adult and lamb survival rates are lower than anticipated. The factors that might be influencing this problem are not well known. No widespread disease problems have become evident, although 3 sheep skulls have been found that showed signs of chronic sinusitis. Predator populations are not known to have markedly increased. However, it has been well documented in the Black Ridge area that mountain lions have preyed on adult sheep in recent years.

Table 1. Desert bighorn sheep classification surveys for the Black Ridge herd.

date	census count	lamb:ewe ratio	ram:ewe ratio	census type
1991 0613	54	53.8/100	42.3/100	hel
1993 0627	39	61/100	8.6/100	hel
1994 0922	20	8.3/100	58/100	ground
1994 1012	31	26.7/100	80/100	hel
1995 0620	25	50/100	100/100	hel

BLACK RIDGE HERD UNIT BOUNDARIES

Generally, the Black Ridge desert bighorn sheep herd unit area is bounded on the north by the Colorado River and the Canyons draining into the Colorado River from Black Ridge and the northeast boundary of the Colorado National Monument to Little Park road, on the east and south by Little Park Road, the southwest boundary of the Colorado National Monument and the Black Ridge Divide, and on the west by the Colorado/Utah state line (Figure 1). It includes the entire Colorado National Monument. This management plan pertains only to lands within Colorado due to jurisdictional boundaries, but a small herd of desert sheep exist in Utah immediately west of the Black Ridge herd in the Marble and Star Canyon area.

DESIRED POPULATION SIZE

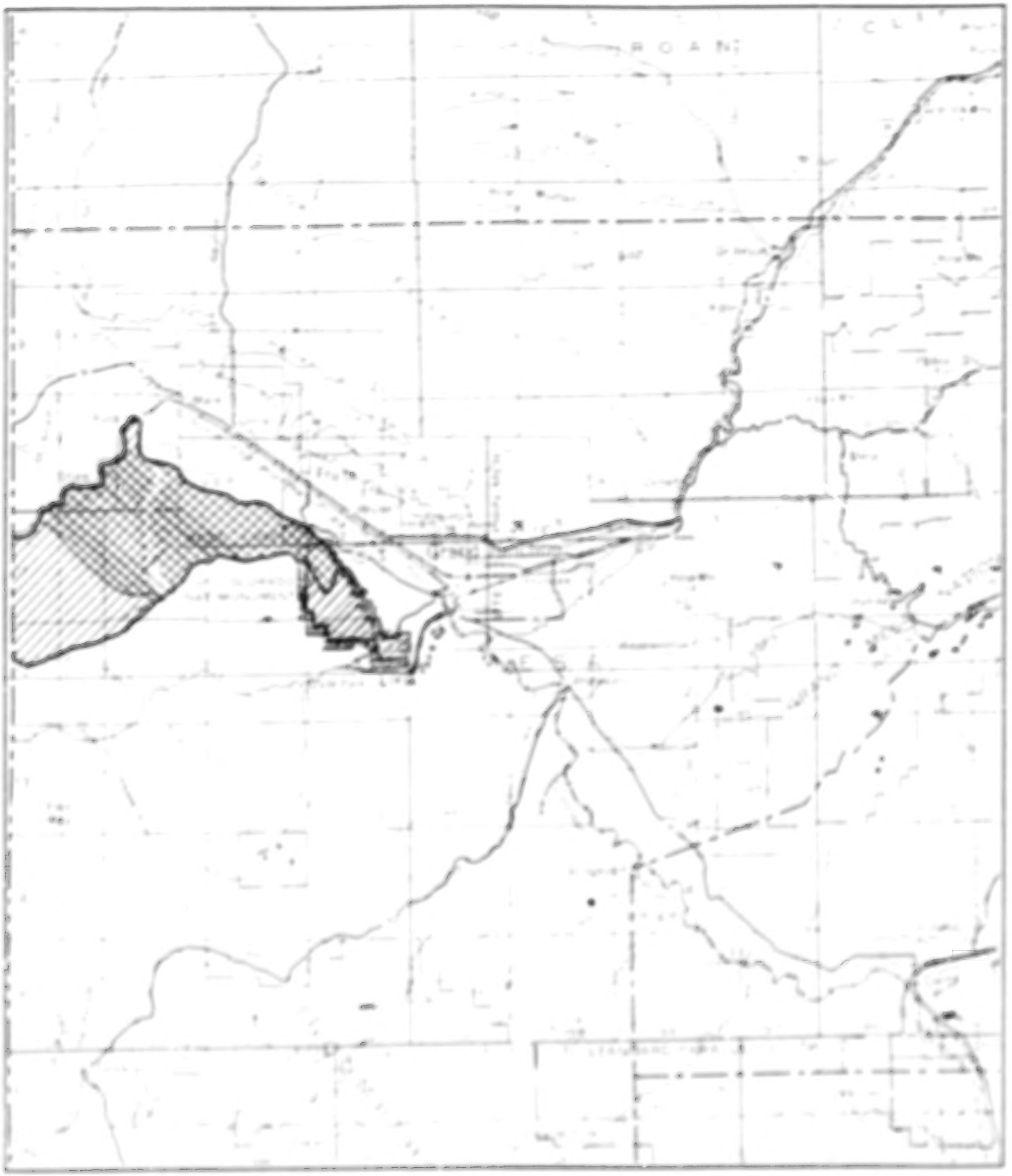
Goal: The goal is to establish a self-sustaining desert bighorn sheep population which will persist over time within the Black Ridge herd unit. The population should be large enough to ensure genetic diversity within the sheep herd. This diversity should be enhanced through random individual interchange with other desert sheep populations in both Colorado and Utah. The CDOW, NPS and BLM will coordinate and cooperate with the Utah Division of Wildlife, Utah BLM and NPS Parks in the management of this sheep herd.

Objective: The long-term objective is to manage this herd unit to support a population ranging from 100 to 525 animals.

DESERT SHEEP POPULATION MANAGEMENT OBJECTIVES

Population Size

Management of sheep numbers is essential for long-term survival of the herd. The habitat available for this herd is finite, which limits the maximum number of sheep that can be



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sustained. Concerns regarding sheep numbers are important with regard to both minimum and maximum numbers.

There is a substantial amount of information available relating to minimum viable population size for wild sheep. If the number of sheep is too low (less than 100), concerns are increased regarding the establishment of a self-sustaining population (Berger 1990). These concerns revolve around genetic diversity and the potential impacts of disease and excessive predation on a small number of animals. Conversely, populations which are too large can adversely impact desired plant community objectives and the domestic livestock industry. Recreational uses would be impacted if the concern for protecting bighorns did not relent commensurately with the increased security of the herd.

Genetic isolation concerns pertain to the level of genetic variation (heterozygosity) in the herd. Low levels of genetic variation may suggest inbreeding is occurring in a population. Inbreeding can result in various types of physiological problems, which are often detrimental to long-term herd survival.

Excessive predation on a small herd, particularly by large carnivores such as mountain lions, can impact the herd's ability to maintain itself. This occurs when annual production in a small herd is unable to keep pace with losses due to predation.

The population objective developed by this plan is a result of both socioeconomic and biological considerations. Some of the socioeconomic considerations include historic uses such as grazing, deer hunting, hiking, horseback riding and other recreational uses, both within and adjacent to the sheep range. Biological considerations relate to the maintenance of healthy vegetative communities and a robust bighorn sheep population. The desired population objective (100-125) reflects a balance between maintaining a viable minimum sheep population and numbers that are too high, which would affect range conditions and other uses.

Minimum population size was determined through a literature review. Symonds and Singer (1995) state that a population of approximately 100 sheep is critical to short term persistence of a few decades for bighorn sheep. Although, Krausman et al. (1993) reports on 6 populations of less than 50 individuals that persisted for at least 14 years in the southwest United States.

The maximum population number for this herd was determined using several different analytical techniques, the results of which were then assessed to achieve the most appropriate number. BLM data indicate that there is enough forage to support 93 desert sheep (Appendix A). This level of use was determined after the forage allocation for domestic livestock had been subtracted from the total available. The BLM used a second method to determine an upper population limit using a habitat suitability rating system developed for desert bighorn sheep. This method indicated a population of 118 sheep could be supported (Appendix B).

The lower population number derived by the two methods was selected as the upper population objective for this herd. This provides a cushion which will serve to further protect vegetation from over utilization.

If populations remain below 50 sheep through a period of 5 years it will be necessary to reevaluate this plan and the need to continue ongoing management practices.

The maximum population objective of 525 sheep may need to be decreased if monitoring data, including the condition of the vegetative environment, indicate that sheep numbers are exceeding desired forage use levels. Populations will be adjusted to a desirable level through sport hunting on land other than those administered by NPS.

Population Monitoring

This plan recognizes that the herd's population may fall below 100 animals in the future. This will not jeopardize ongoing management practices including population monitoring, habitat management and hunting seasons. Continued active management of this herd will be based on population monitoring data including:

a. Population size
b. Recruitment of young into the adult population
c. Impacts of predation
d. Incidence of disease problems

Both resident populations and recently transplanted populations will be monitored. Monitoring will be conducted to determine critical biological components that document the viability of the herds. These components include:

1. Reproductive success as measured by both the number of lambs born and survival through the first year of life. Survival to the first year would be termed recruitment into the population.
2. Sex/age ratio data. This would include the number of rams and lambs per 100 ewes.
3. Survival of adult animals, including average length of survival in years. Documentation of mortality factors, including predator losses.
4. Movements throughout their ranges relative to times of the year.
5. Delineation and documentation of critical ranges including seasonal use areas (spring, summer, fall, winter), lambing areas, breeding sites, migration corridors, avoidance areas (suitable habitat not used), preferred feeding sites, and escape terrain.
6. Annual population estimates based on the best available data.
7. Assessment of human-related impacts, including the impact of dogs (see section below).

Sheep monitoring and population assessment will be conducted using several different methods, these include:

1. Monitoring will be conducted by ground and aerial survey. Aerial survey will be conducted by both fixed-wing and helicopter aircraft. CDOW will provide the fixed-winged aircraft. Helicopters will be contracted when needed.
2. Sheep locations will be filed in a computer database. Locations will be kept by the Universal Transverse Mercator mapping system. Other pertinent biological and physical data regarding sighting locations will also be recorded and stored in the database.
3. Intensity of monitoring will vary based on the biological season of the year. Regular monitoring will be conducted to study the survival and condition of each animal. Schedules will be developed so that data necessary to evaluate study requirements are met.
4. Data will be used to update CDOW Wildlife Resource Information System (WRIS) mapping files. Annual reports will be completed documenting results of field studies.
5. Survival, movements, and mortality will be documented using radiotelemetry when collared sheep are available in the population.

Transplants:

The intent is to established a self-sustaining population rather than maintaining minimum populations through a series of transplants. Transplants will not be used to increase herd size in the event natural herd production is unable to maintain minimum population size. Also, additional data is needed from population monitoring to clarify the criterion for future transplants.

Currently, future transplants will be considered as follows:

1. To extend the range of the herd to encompass the entire desired unoccupied potential habitat (Figure 1) if sheep do not expand naturally on their own. It has been found that bighorn sheep are often poor pioneers because of social bonding that favors use of established areas (Risenhoover et al. 1988).
2. To ensure increase heterozygosity if genetic testing indicates that it would be advisable to increase genetic diversity.

The BLM and NPS will complete National Environmental Policy Act (NEPA) requirements for all future transplants on public lands in their jurisdiction. Public involvement will remain an important part of this process.

Predation

Recently acquired data indicate that mountain lions may be having a significant impact on the sheep population. Between November of 1995 and May 1996, 7 radiocollared sheep died. Field inspection of the carcasses indicated 5 were killed by mountain lions, 1 sheep may have been killed by lion and the last died of

unknown causes, but was not likely killed by predators. There is also speculation that a significant portion of the lamb mortality may be attributed to predation, but no definite data are available to support this supposition.

Two recently published reports conclude that mountain lion predation can be a significant limiting factor on herd viability (Boyce et al. 1996, Ross et al. 1996). In some cases lion predation on bighorn sheep appears to be largely an individual, learned behavior with some individuals preying heavily on sheep.

This information combined with Black Ridge monitoring data may indicate a similar situation with one or several lions that are having a significant impact on the population. Mountain lion harvest in the Black Ridge area is known to be very low. Hunters and outfitters who guide hunters are reluctant to hunt this area due to the difficult terrain and problems this can cause with pursuit hounds. In recent years the annual harvest quota for mountain lion has not been met in CDOW Game Management Unit 40. Since 1990, 57% (31 harvest/54 quota) of the quota has been taken by hunters. In order to encourage harvest and target mountain lion, several possible alternative will be explored by CDOW (Note: hunting is prohibited within Colorado National Monument). These options include:

1. Encourage outfitters to guide hunters on an "old west" horseback hunt. This type of hunt may appeal to a certain category of hunters.
2. Provide incentives to encourage lion hunting in the Black Ridge area by increasing the bag limit to 2 lions.
3. If monitoring shows that one or a few lions are causing most of the mortality, then target that lion for harvest. This may include special hunts to target specific animals. As part of ongoing monitoring studies, removing specific lions may help in determining if individual lions may be responsible for much of the predation losses.

Conflict resolution domestic/wild sheep concerns

Considerable controversy throughout the western U.S. revolves around the issue of potential disease interactions between bighorn and domestic sheep. The issue centers around the possibility that domestic sheep may transmit diseases to wild sheep populations resulting in large die offs of the wild herds. Michael Miller, DVM PhD, and CDOW veterinarian, in a letter to the American Association of Wildlife Veterinarians states:

> "Pasteurellosis has long been recognized as an important disease of both bighorn sheep and domestic livestock. A pneumonia complex impairs bighorn populations performance throughout North America, and similar respiratory disease complexes plague both cattle and sheep industries worldwide. The bacteria, Pasteurella spp., play a major role in each of these. Wildlife and agricultural professionals share

frustration over inability to completely understand and control these complexes" (Miller 1989).

In light of this potential disease dilemma, current recommendations from most wildlife managers encourage, that where possible, bighorns and domestic should not extensively share habitat. However, Miller (1989) further recommends a conservative approach to co-management of domestic and wild sheep. Due to the considerable amount of uncertainty regarding the aspects of disease interchange, Miller concludes that the extent of conservatism in managing these interactions should be decided by local wildlife and livestock professional on a case-by-case basis.

During the course of the development of this management plan, working group members encountered similar controversy regarding this disease problem. Our approach to this problem evolved in the direction of the recommendations that Miller suggested i.e., we decided to deal with the concerns at a local level and recommended the following actions discussed below.

Currently, there is no domestic sheep grazing within the Black Ridge bighorn herd boundaries or adjoining lands to the south. Most of the BLM grazing allotments on lands within or adjacent to the herd area were voluntarily changed from sheep to cattle by the permittees except the Upper Bench, Battleship and 26 Mile allotments which still authorize sheep grazing. There are no limitations or restrictions which would prevent landowners from changing back to sheep grazing on their private land or on BLM allotments which currently authorize sheep use. On BLM lands that were converted to cattle, the permittee would have to obtain authorization to change back to sheep. Large portions of the Black Ridge herd area are not grazed by livestock including the Colorado National Monument (grazing is prohibited within the boundaries of Colorado National Monument), major canyon bottoms and the benches above Pollock and Plume Canyons.

In order to minimize conflicts which may be detrimental to bighorn sheep, the following actions should be considered in the event domestic sheep are again grazed in close proximity of the Black Ridge herd. These concepts are predicated on cooperative attitudes and open communications between private landowners, BRS, BLM and CDOW.

It has been noted in the past in the Black Ridge area that domestic sheep have been observed to be spatially close to wild sheep and no known mingling has occurred and with no documented adverse impacts to wild sheep.

1. Natural barriers should be used on BLM lands to maintain separation of sheep in the event that domestic sheep grazing is begun in close proximity to the wild sheep. Both topographic and vegetative barriers should be considered. These will be dealt with on case-by-case basis on allotments. Natural barriers include rocky cliffs, ridges, escarpments and vegetation. Dense pinyon-juniper woodlands should be encouraged in border areas where domestic sheep may be grazed.

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Both natural and prescribed fire should not be encouraged in these areas.

2. Fencing (conventional livestock), in short segments, should be used to augment natural barriers on BLM lands. Extensive segments of conventional fencing, 8 foot, or double fencing is considered too expensive to use over the entire Black Ridge herd unit boundary. CDOW may install fencing if there are consistent problems in localized areas. Movements of other species of wildlife, including deer and elk, should be considered prior to fence construction.
3. Grazing permittees would be allowed to change from cattle to sheep on nearby BLM lands provided a management plan or cooperative agreement is adopted by CDOW, BLM, NPS and the permittee to minimize the risk of mingling of wild and domestic sheep. This also applies to trailing of domestic sheep.
4. Aggressive herding should be used to prevent mingling of bighorns and domestic sheep. As an example, Idaho allows herding dogs to deter bighorns in efforts to discourage mingling. Aggressive herding could include extra herding dogs, extra herders or any other herding techniques applied to reduce the possibility of mingling.
5. The purchase of easements may be used in the event that other methods prove unsatisfactory in maintaining separation between wild and domestic sheep.

The CDOW will respond to the presence of bighorn sheep on private land on a case-by-case basis as it applies to potential disease situations. Capture, quarantine and monitoring (including assessment for research information) will be the first priority in handling situations where there is concern for the welfare of the wild sheep. Euthanasia of wild sheep will be a secondary preference where the health of the entire wild herd may be in jeopardy.

Game damage situations will be handled by the CDOW according to Colorado Division of Wildlife guidelines.

Recreation conflicts with desert bighorn sheep

Wildlife research and management studies have shown that bighorn sheep can be affected by human use of the environment. Human-wildlife interactions are especially relevant in wilderness areas where resource managers must attempt to provide habitat for species that may be very sensitive to human activities (Hendee et al. 1990).

In order to avoid impacts detrimental to bighorn sheep, recreational users of the Black Ridge area need information and education regarding wild sheep behavior. Human use of the area may need to be regulated in some manner to further protect sensitive areas.

Additionally, studies (Harris et al. 1993) have shown that 1 group in 5 recreational users was accompanied by dogs in New

Mexico. Dogs, by nature, tend to roam extensively when out with recreationists and some may potentially harass or kill wild sheep.

Currently, there are no known areas where direct impact by human use has been detrimental to the Black Ridge bighorn sheep herd. However, recreational use is increasing as people become more familiar with the recreational opportunities that exist in the area.

The amount and intensity of recreational use is important information when evaluating impacts on desert sheep. Additional data should be collected in order to more accurately assess impacts to sheep should they occur. Currently, there are trailhead registration books at Liberty Cap, Monument, Devil's and Pollock Canyon trailheads. Data related to recreational use may be collected by the following means:

1. Interested individuals (volunteers)
2. River outfitters
3. CDOW surveys
4. NPS and BLM surveys including additional trailhead sign-in stations
5. Trail and road electronic traffic counters

During this desert sheep planning process specific localities were identified where recreational activities were of concern to desert bighorn populations. Efforts should be directed at minimizing human disturbance in crucial areas, e.g., lambing, rutting and other seasonal concentration areas.

Implementation of proposed management actions initially will be done through information and education programs. More formal regulations may be necessary if voluntary compliance efforts are unsuccessful.

Informational brochures will be prepared and distributed by CDOW, NPS and BLM which will include information regarding desert bighorn sheep protection, management and viewing. This information on management will be sent to appropriate recreational users including hiking and climbing organizations, professional commercial users, outdoor equipment retailers and at the Glade Park store. River outfitters will be asked to assist in protecting important desert sheep areas and habitat.

Potential Recreational Conflict Areas

1. Devils Canyon - This area receives approximately 6000 recreational visits per year. Most of the activity is in the form of recreational hiking (75%). Almost a third of the use occurs during the month of May. There is the potential for commercial recreational rock climbing to occur on the canyon walls. Devils Canyon is used year-round by desert sheep. It is also a known lambing area. Impacts would be to lambing and disruption of the overall use of the canyon by sheep.

Management Direction

a. Hiking in the main canyon is acceptable. Hikers will be encouraged to hike only as far as the old BLM cabin.
b. Hiking in the side canyons will be discouraged, particularly during lambing season from April 1-June 1 each year.
c. Rock climbing should be encouraged at alternative sites away from Devils Canyon. Commercial permits for climbing and horseback riding need stipulations for seasonal restrictions--April 1 - June 1 annually for lambing season.
d. Installation of information signs at Devil's Canyon trailhead and old cabin.

2. Pollock and Flume Canyon - This area receives approximately 5000 recreational visitors per year. Roughly half are mountain bikers, the remaining half are hikers and horseback riders. These canyons are used by bighorn sheep, particularly both forks of Pollock Canyon. Lambing is known to occur in these areas. Concerns are associated with the Pollock Bench bike trail and increased hiking into the canyons.

Management Direction

This area will be monitored to determine if recreational use is at levels which may adversely impact bighorn sheep. If problems occur, then seasonal closures and other management may be necessary.

a. CDOW remote monitoring of sheep use
b. BLM trailhead monitoring station (sign-in trail book) and trail traffic counter

3. Mee Canyon - This remote area is a desirable destination site for hikers due to its unique geological features, including the alcove in the upper portions of the canyon. Desert bighorn sheep inhabit the entire canyon as well as the alcove area. Public use (number of visits) to the alcove site is unknown, but has increased significantly in the last 5 years. A lack of escape routes above the alcove may limit sheep use if recreational activities are excessive.

Management Direction

The Mee Alcove Trail and signing issues are being addressed in the Ruby Canyon Plan. The management practices included in this plan should be implemented for management of desert bighorn sheep.

4. Rattlesnake Canyon - This canyon is important bighorn sheep habitat. It is both a lambing area and year-round use area.

Management Direction

Construction and maintenance of an information trail sign at the "T" in the road near the heads of Mee and Rattlesnake canyons.

5. Colorado National Monument - Bighorn sheep are often found using western portions of the Monument. Most commonly sheep

are observed in Monument, Fruita and Kodels Canyons, as well as along the historic Rim Rock Drive. Visitors are known to get out of their vehicles and disturb wild sheep. This is for the most part unintentional.

Management Direction

Educate visitors through interpretive programs and brochures as to the sensitivity of wild sheep to humans. Encourage visitors to view sheep at appropriate distances and from their vehicles.

HABITAT MANAGEMENT OBJECTIVES

Management of the habitat on Black Ridge is essential for maintenance of the ecosystem. Similarly, habitat management is an important part of maintaining desert sheep populations. Currently, the BLM is in the process of developing a management plan for the Ruby Canyon area, which encompasses most of the Black Ridge desert sheep range. During the development of the Ruby Canyon Plan, desert bighorn sheep habitat concerns and requirements are being considered. Therefore, this desert bighorn management plan will comply with recommendations and decision developed for habitat management in the Ruby Canyon Plan.

The Ruby Canyon Plan will address but is not limited to road management, desired plant community characteristic, natural fire management, and recreation management.

As wild sheep habitat within Colorado National Monument is being managed as a natural ecosystem, no habitat management improvements are contemplated.

Grazing Management (BLM)

Cattle grazing is one of the many uses occurring in the Black Ridge area outside of Colorado National Monument. During the development of bighorn sheep population objectives, bighorn forage availability was determined after domestic livestock consumption was considered. Grazing management is addressed in allotment management plans developed by the BLM.

Natural Fires

Natural fire, except for bighorn vegetative barriers, will be encouraged on BLM lands as directed in the Ruby Canyon Management Plan. In critical bighorn sheep use areas, increasing the amount of open visual distance in the pinyon-juniper habitat would be a desirable goal. All natural fires are suppressed on Colorado National Monument lands. However, future prescribed fire management plans may amend this policy.

Habitat Improvement Projects

Limited opportunities exist within the National Monument and BLM Wilderness Study area for habitat alteration or augmentation.

However, removal of man-made obstacles such as old fences may be appropriate in both areas. Small scale water developments are appropriate for BLM WSAs and two presently exist.

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APPENDIX A. ESTIMATION OF CARRYING CAPACTIY - METHOD 1

Allotment	Total Available Forage (lbs)	Allowable Use (50%)	Authorized Livestock AUMs	Livestock Forage (lbs)	Forage Available After AUMs (lbs)	Sheep Capacity (#)
Mtn Island	2,938,680	1,469,340	1,180	920,400	548,940	304
CO Ridge	1,108,478	554,239	659	514,020	40,219	22
Rattlesnake	143,699	71,850	21	16,380	55,470	31
Little Dolores Bench	304,389	152,194	97	75,660	76,534	43
Black Ridge	551,984	275,992	459	358,020	0	0
Radio Tower	157,201	78,600	119	92,820	0	0
Upper Bench	932,589	466,294	328	255,940	210,454	117
Burke	217,229	108,615	100	78,000	30,615	17
Knowles	361,057	180,528	234	182,520	0	0
Lower Bench	1,367,388	683,694	1,400	1,092,000	0	0
Unalloted	1,148,163	574,082	0	0	574,082	319
				Total	1,536,314 lbs	853

Total Available Forage. Forage available for bighorn sheep and livestock.

Allowable Use: 50% of Available

Livestock Forage: AUM's x 780 lbs. of forage per AUM

Forage Available After AUM's: Allowable Use - Livestock Forage

Sheep: Forage Available After AUM's divided by 1800 lbs. of forage per sheep per year

Note: analysis does not include lands within Colorado National Monument

APPENDIX B. ESTIMATION OF CARRYING CAPACITY -- Method 2.

To estimate the carrying capacity of the Black Ridge DBHS herd's range, the following publication was used:

> Armentrout, D.J., and W.R. Brigham. 1988. Habitat Suitability Rating System for Desert Bighorn Sheep in the Basin and Range Province. BLM Technical Note 384. 18 pp.

The method considers 10 habitat variables to derive a factor that rates the quality of the range. This factor used with size of the range and the estimated density of bighorns on the best ranges yields the estimated carrying capacity of the range. The rating system was modified by using the arithmetic mean of the weighted variables, called Weighted Indices (WIs), instead of using the geometric mean. The concept of the geometric mean is that the habitat suitability rating factor must be less than its weakest WI. This negates the weight of the other habitat variables. This seems extremely conservative and would imply that the existing herd is impossible.

The following habitat variables and the scores are averages for the existing and designated potential range of the Black Ridge herd of desert bighorn sheep.

Suitability Index Variable (SIV)	Rating & Description
1. Topography	0.70 mesas & canyons
2. Water, amount & permanence	0.70 average site dry 25% of all years
3. Water, distance	0.80 distance from escape terrain
4. Water, competition	0.50 some big game & livestock
5. Visual obstruction	0.70 at distance 50'& height 3' > 60% of object visible
6. Water, distribution	0.35 percent of area within mile of H20
7. Forage areas	0.70 forage rating for majority of range
8. Vegetation condition	0.75 late seral stage
9. Space--human conflict	0.70 medium use, restrictions, no economic change
10. Domestic sheep, distance	0.10 usually bit less than 5 miles

Weighted Indexes

Cover = SIV#1 = 0.70
Water = SIV#2((SIV#3+SIV#4+SIV#5+SIV#6)/4) = 0.41125
Forage = SIV#3+SIV#5+SIV#7+SIV#8 = 0.7375
Human = SIV#9 = 0.70
Sheep, domestic = SIV#10 = 0.10

Habitat Suitability Rating = HSR = (WIC+WIW+WIF+WIH+WIS)/5 = 0.53
Total Square Miles = TSM = 145 = 93,000 acres
OCCurrence = optimum # of bighorn sheep per square mile, from literature = 7.0
Carrying Capacity = HSRxTSMxOCC = **538 desert bighorn sheep**

Note: analysis includes lands within the Colorado National Monument

APPENDIX B

SELECTION CRITERIA AND ASSUMPTIONS REGARDING TARGETED ACTIVITIES AND BENEFIT OPPORTUNITIES

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SELECTION CRITERIA AND ASSUMPTIONS REGARDING TARGETED ACTIVITY AND BENEFIT OPPORTUNITIES

Selection Criteria - The following selection criteria were used in order to determine which Activity and Benefit Opportunities to target in the management plan.

1. Demand from User Publics - What did both the qualitative and quantitative research results compiled during the survey phase of this process show?

2. Supply - Does the RCBR area have significant capability to provide these opportunities (i.e., significant relative to other RCBR zones and to other public lands in the region)?

3. Proactive Management - Is there a consequent expectation that BLM and its partners are going to explicitly address within the plan, specific management actions to deliver certain value-added outcomes to certain identified customers.

4. Relating Targeted Benefit Opportunities to Vision and Area Goals - Are targeted outcomes consistent with the vision and general management goals for the RCBR area?

Tables B-1 and B-2 summarizes the targeted activity and benefit opportunities for the eight recreation management zones in the RCBR area.

Assumptions - Inherent in the objectives and actions put forth in Chapter 5 are several assumptions. They are as follows:

- The Benefits Based Management approach moves beyond our previous consideration only of on-site benefits, and moves us to considering improved conditions that may result off-site as well.

- Just as it is recognized that the BLM has a role in contributing to the realization of off-site benefits, non-agency partners also have a role in contributing to the realization of on-site benefits as well.

- It is recognized that other activities other than the "targeted activities" occur in the various zones. This also applies to targeted outcomes or outputs.

- The BLM is dependent on its private sector and local community service partners to deliver targeted benefits.

- It is recognized that our ability to document connections between on-site management actions and resulting improved conditions is not yet what we would want it to be but this lack of more solid empirical evidence has not dissuaded RCBR partners from trying to improve human conditions in areas where there is nonetheless considerable supportive research and more than ample anectodal evidence that Public Lands recreation and leisure does directly contribute to improved conditions to the lives of individuals, households, and quality of life of local communities and their economies, and even to various components of the environment (animal and plant species). The relationships between the various targeted benefits (Activities, Psychological Experiences and Other Benefits), both on-site and off-site, are shown in Appendix D, through what is termed the "**Benefit Chain of Causality" (BCC)**. The BCC merely shows the links the various benefits have to each other in relation to the ROS settings.

- A direct relationship between one recreation outing and the realization of targeted benefits is not implied. The achievement of certain kinds of benefits are dependent upon the cumulative contributory beneficial effect of recreation, tourism and other components of the RCBR ecosystem.

- These objectives imply some implementing actions that BLM cannot do on its own. For example, reducing exposure to at-risk youth in local communities will require the direct involvement of BLM's community service providers.

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TABLE B-1 — TARGETED ACTIVITY OPPORTUNITIES FOR RUBY CANYON/BLACK RIDGE

TARGETED ACTIVITIES	ZONES							
	Rabbit Valley			Mary's & Sam's Loops	Ruby Canyon	Black Ridge East		Black Ridge West
	Riding Area	Trail Thru Time	McDonald Ck., Wildhorse Mesa & Rabbits Ear			South-western Perimeter	Pollock Canyon Complex	
Motorized:								
• OHV Driving	x					x		
• Boating		x						
• Dinosaur Fossil Viewing								
Mechanized but not Motorized:								
• Mountain Bike Riding – Single Track	x			x				
• Mountain Bike Riding – Single & Double Track						x	x	
Neither Motorized nor Mechanized:								
• Boating					x			
• Day Hiking			x		x		x	x
• Wilderness Backpacking								
• Viewing Arches						x		
• Rock Art Viewing			x					
• Dinosaur Fossil Viewing		x						
• Horseback Riding			x					
• Viewing Wildlife						x		
• Waterfowl Hunting					x			
• Big Game Hunting								x

TABLE B-2 ——— **TARGETED BENEFIT OUTCOMES FOR RUBY CANYON/BLACK RIDGE**

TARGETED BENEFITS	ZONES							
	Rabbit Valley			Mary's & Lion's Loops	Ruby Canyon	Black Ridge East		Black Ridge West
	Riding Area	Trail Thru Time	McDonald Ck., Wildhorse Mesa & Rabbits Ear			South-western Perimeter	Pollock Canyon Complex	
Psychological Experiences:								
Achievement/Stimulation--								
• Meeting desired challenges				x	x			x
• Enjoy risk taking canyon adventure				x	x			x
• Improving skills				x				x
• Enjoying strenuous physical exercise				x				
• Testing your endurance				x				x
• Enjoying area accommodations & restaurants *		x		x	x	x		
• Getting excited about bringing the canyon experience into the classroom *			x				x	
• Getting excited about expanding the classroom to include an actual dinosaur quarry *		x						
• Enjoying the "Jurrasic Park" experience *		x						
Exercise/Fitness--								
• Quickly accessing natural resource environments	x		x	x				
• Enjoying frequent exercise	x		x	x				
• Enjoying frequent access to a range of physical challenge	x						x	
Autonomy--								
• Feeling good about ...ng isolated & independent								x
• Enjoying easy access to diverse primitive and unconfined outdoor recreation environments							x	
• Accessing descriptive visitor information about area recreation/tourism attractions and Benefit Opportunities *	x	x	x	x	x	x	x	x
• Enjoying having access to different types of tours to the Arches *								
Family Togetherness/Similar People--								
• Enjoying the closeness of friends and family	x		x		x	x		
New People--								
• Enjoying meeting new people having similar interests		x						
• Enjoying group outdoor events	x							

TARGETED BENEFITS	ZONES							
	Rabbit Valley			Mary's & Lion's Loop	Rabs Canyon	Black Ridge East		Black Ridge West
	Riding Area	Trail Thru Time	McDonald Ck., Wildhorse Mesa & Rabbits Ear			South-western Perimeter	Pollock Canyon Complex	
Psychological Experiences (continued):								
Learning--								
• Enjoying learning outdoor recreation & outdoor social skills	x							
• Enjoying directed experiential learning about dinosaur ecology and area geology		x			x			
• Discovering/contemplating man's relationship with the land (Rabbit Ear)			x					
• Enjoying learning about man's influence on the natural world and its potential beneficial influence on individuals, society and the economy (Devils Canyon)							x	
Nature/Exploration--								
• Enjoying exploration			x					
• Enjoying being able to discover & learn about earlier cultures (McDonald Creek)			x					
• Enjoying viewing & exploring the arches						x		
• Enjoying canyon river & rock art aesthetics			x					
• Enjoying viewing/examining dinosaur fossils on your own in their natural setting		x						
• Savoring river canyon aesthetics					x			
• Savoring area canyon country aesthetics							x	
• Savoring Wilderness aesthetics								x
Introspection--								
• Enjoying reflecting on personal and family values					x			x
Creativity--								
• Enjoying artistic self expression						x		
Escape Personal-Social/Physical Pressures--								
• Escaping everyday responsibilities for awhile	x			x			x	
• Releasing or reducing some built up mental tensions				x			x	
• Enjoying mental and physical rest					x			
Security--								
• Appreciating knowing others are nearby for social interaction & risk reduction							x	
Service Support--								
• Receiving quality mountain bike service & equipment support *				x				
• Receiving quality boating and hiking gear service & equipment support *					x			
• Enjoying having a tour operator take us to the arches						x		

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TARGETED BENEFITS	ZONES							
	Rabbit Valley			Mary's & Lion's Lunch	Ridley Canyon	Black Ridge East		Black Ridge West
	Riding Area	Trail Thru Time	McDonald Ck., Wildhorse Mesa & Rabbits Ear			Southwestern Perimeter	Pollock Canyon Complex	
Other Benefits:								
Individual –								
☐ *Better Physical Health and Health Maintenance*								
• Restored body from persistent fatigue	X		X	X	X		X	X
• Improved physical fitness/better health maintenance	X			X				X
• Reduced hypertension/high blood pressure				X	X		X	X
• Improved physical health								
• Improved opportunity for differently-skilled individuals to exercise	X				X			X
☐ *Better Mental Health and Health Maintenance*								
• Improved mental health					X			X
• Restored mind from unwanted stress	X	X	X	X	X		X	X
• Diminished mental anxiety/depression				X	X		X	X
• Improved sense of control over one's life	X			X			X	X
• Greater overall sense of personal wellness								X
• Renewed human spirit								X
• Spiritual growth								X
☐ *Personal Character Development*								
...*Personal Growth*								
• Improved understanding of how involvement in natural resource settings builds character							X	
• Improved self competence	X		X	X				X
• Improved self reliance								X
• Greater self assurance				X	X			X
• Increased adaptability				X	X			X
• Clearer personal values				X	X			X
• More balanced competitive spirit						X		
...*Greater Creativity*								
• Increased artistic self expression		X						

TARGETED BENEFITS	ZONES							
	Rabbit Valley			Mary's & Lion's	Rabbs Canyon	Black Ridge East		Black Ridge West
	Siding Area	Trail Thru Time	McDonald Ck., Wilderness Mesa & Rabbit Ear	Loops		Southwestern Perimeter	Pollock Canyon Complex	
...Better Grasp of Human Dependence & Effect								
• Improved understanding of rural-urban interface							X	
• Enhanced understanding of the community's effect on the environment *			X				X	
• Improved understanding of human dependency on the land			X				X	
...Greater Sensitivity to Local Cultures								
• Increased knowledge of and sensitivity to earlier cultures			X					
• Greater sensitivity to local traditional cultures			X					
• Improved ability to relate to ranching and rural cultures			X					
• Enhanced sense of stewardship for private land & respect for traditional cultures			X					
• Enhanced cultural resource (e.g., artifacts and sites) stewardship ethic			X					
...Greater Wilderness Stewardship								
• Improved understanding of Wilderness							X	
• Improved Wilderness ethic							X	
...Improved Skills								
• Improved outdoor knowledge, skills & self-confidence	X			X	X			X
• Improved problem-solving skills				X	X			X
• Improved leadership abilities	X				X			
• Greater cognitive efficiency		X						
• Greater ability to relate outdoor adventure to others				X	X			X
• Improved paleo curation skills		X						X
...Enhanced Environmental Learning								
• Improved learning of natural processes						X	X	
• Enhanced awareness of the arches as a special place						X		
• Enhanced environmental stewardship ethic	X						X	
• Greater sense of stewardship for in situ paleontology		X						
• Improved knowledge of area paleontology and geology		X						
• More highly stimulated students *		X	X				X	
• Greater scholarship and a more positive mental attitude about learning *		X	X				X	
II Personal Appreciation and Satisfaction								
...Greater Personal Autonomy								
• Enhanced sense of freedom	X		X	X				X
• Greater sense of freedom in being able to get to this special place						X		
• Enhanced ability for visitors to more easily find areas offering what they want *	X	X	X		X	X	X	X

TARGETED BENEFITS	ZONES							
	Rubber Valley			Mary's & Lost's Loops	Ruby Canyon	Black Ridge East		Black Ridge West
	Siding Area	Trail Thru Time	McDonald Ck., Wilderness Mesa & Rabbits Ear			South-western Perimeter	Pollock Canyon Complex	
...*Maintained & Enhanced Lifestyle*:								
• Greater cultivation of outdoor-oriented lifestyle	x		X	X **	X **	x *	x	x
• Improved sense of personal security							x	
• Greater freedom from urban living							X	
• Greater visitor satisfaction in being able to do desired trip *						X		
○ Greater sense of freedom to engage in outdoor pursuits							x	
• Enhanced sense of place ethic						X		
• Greater community appreciation of the arts						X		
• Increased quality of life	x		X	X **	X **	x *	x	
...*Heightened Environmental Awareness & Appreciation*:								
• Greater aesthetic appreciation			X		X	X	x	x
• Greater environmental awareness and sensitivity	X		x		x	x	X	X
• Well-informed & more responsible visitors *	X	x	x	x	X	x	x	
• Heightened awareness and improved understanding and appreciation of how dinosaurs lived, died, and are still preserved **		X						
• Greater appreciation of dinosaur fossils in their natural setting		x						
• Greater overall awareness and understanding of and sensitivity to paleontology		X						
• Greater appreciation of paleo's contribution to experiential learning		x						
Social --								
...*Enlarged Sense of Community*:								
• Increased opportunity for affiliation with others								X
• Improved understanding of other people		X						
• Improved functioning of individuals in family and community *			x		X	x	x	
• Heightened sense of community pride and satisfaction	x	X	x	X **	X *	X **		
• Improved social cohesion with people of the community having similar interests		X						
• Better community integration			x					
• Increased social support								
• Reduced numbers of at risk youth	x	X	x		X	x		X
• Improved opportunity to keep vari-skilled groups together	X							
...*Strengthened Households & Families*:								
• Maintained and enhanced group cohesion & family bonding	X	x	x		X	X		
• Improved parenting	x		x		x	x		
• Greater nurturance of others	x		X		X	x		

TARGETED BENEFITS

	ZONES							
	Native Valley			Mary's & Lost's Range	Ruby Canyon	Black Ridge East		Black Ridge West
	Riding Area	Trail Thru Time	McDonald Ck., Middlesex Mesa & Rabbit Ear			South-western Perimeter	Pollock Canyon Complex	
...Attractive Tolerance								
• Greater sensitivity to the recreational preferences of others	X				x			
• Greater tolerance among traditional & new users			X					
• Improved tolerance of others	x				x			
Economic →								
• Increased work productivity				X			X	x
• Well-equipped customers *				X	X			
• Satisfied guests *		X		x	x *	X *		
• Increased value added to local-regional economy	x	X		X	X	x		
• Improved economic stability from tourism						X		
• Positive contribution to local-regional economic stability	x	x **		x *	x **	x **		
Environmental →								
...Improved Relationship with the Land								
• Improved relationship with the natural world						X	X	
• Improved community involvement in environmental issues						X **		
• Greater community involvement in public issues		X						
...Improved Care for the Land								
• Greater environmental stewardship	X	x *	X *		X *	x **	x **	X **
• Improved land stewardship							X	
• Increased resource protection			X					
• Improved maintenance of biophysical systems							x	

Notes:

* Generated off-site (placed by the targeted benefit listed, this applies to all zones listed)
(when placed by zone mark (x), applies only to that zone)

** Generated both on- and off-site

x = Targeted Benefit Outcome
X = Most Significant Targeted Benefit Outcomes

APPENDIX C

RECREATION OPPORTUNITY SPECTRUM PROCESS AND CLASSES

RECREATION OPPORTUNITY SPECTRUM PROCESS

Recreation area management objectives are defined through a planning process referred to as the Recreation Opportunity Spectrum (ROS). The ROS process provides a framework for defining classes of outdoor recreation environments, activities and experience opportunities. The settings, activities and opportunities for obtaining experiences have been arranged along a continuum or spectrum divided into six classes:

- Primitive
- Backcountry
- Middle Country
- Front Country
- Rural
- Urban

These classes cover the full range (spectrum) of experience opportunities from pristine environments to highly developed, manmade environments. The resulting ROS analysis defines specific geographic areas on the ground, each one encompassing one of the unique recreation opportunity classes.... primitive, backcountry, etc. The maps and tables below, define each ROS class in terms of its physical, social and managerial settings. Table C-1 summarizes the targeted settings for the RCBR environment in each of the eight recreation management zones.

PHYSICAL SETTING:

Factor	Primitive	Backcountry	Middle Country	Front Country	Rural	Urban
Nearness to /Distance from Roads	Greater than 3 miles from all roads	At least 1/2 mile from all roads	Near or on 4WD roads, but at least 1/2 mile from all improved roads	Near or on roads drivable by autos, but at least 1/4 mile from highways	On or near primary highways	On or near primary highways
Degree of Naturalness	Unmodified natural environment, at least 5,000 acres	Largely unmodified or natural appearing environment, at least 5,000 acres	Largely unmodified or natural appearing environment, at least 5,000 acres	Resource modifications evident but harmonious with a natural appearing environment	Substantially modified environment having both natural and manmade features, rural or agricultural landscapes	Naturally appearing background in a substantially urbanized environment, exotic vegetation, buildings and powerlines may be dominant
Amount of Developed Facilities	Very few to no facilities	A few primitive facilities such as trails and signs, but hardly noticeable	A few primitive facilities such as trails and signs, but hardly noticeable	Some rustic facilities, harmonious with the land, for resource protection and visitor safety (e.g., picnic tables, pit toilets, fire grates, etc.)	Moderate number of facilities to manage use, accommodate considerable numbers of people, and some for special activities (e.g., boat launches, interpretive gazebos, etc.)	Numerous facilities to manage and accommodate intensive use, facilities for special activities are common (e.g., surfaced trails, intensively developed campgrounds, stores, etc.)

SOCIAL SETTING:

Factor	Primitive	Backcountry	Middle Country	Front Country	Rural	Urban
Contacts with Other People	Very little contact with other people (see 6 or fewer parties per day; no groups visible from your campsite)	Little contact with other people (see 6-15 groups per day; less than 3 groups visible from your campsite)	Moderate contact with other people (see 15 or more groups per day; see 7-14 groups away from roads and developed sites)	Moderate to high degree of contact with other people on roads (see 30 of more groups per day; see 15-29 groups away from roads)	Moderate to high degree of contact with other people on roads and trails, at developed sites, and on water surfaces; moderate away from roads, trails developed sites, and water surfaces)	In constant contact with other people (large numbers of users on-site and in nearby areas)
Evidence of Other Users	Evidence of others unnoticeable when hiking through the area	Evidence of others subtly noticeable but not drawing attention when recreating in the area	Human use alterations easily noticeable but not drawing attention to visitors driving primitive roads and trails	Human use alterations may be dominant within the area but would be subordinate or even unnoticed from main roads	Culturally modified landscape dominates the view from the main roads; people are almost continually in view	Structures dominate the landscape and high concentrations of people are commonplace

MANAGERIAL SETTING:

Factor	Primitive	Backcountry	Middle Country	Front Country	Rural	Urban
Amount of on-the-ground Visitor Management	No on-site visitor management or information facilities	A few subtle visitor management controls or visitor information facilities are present, but subtle	A few subtle visitor management controls or visitor information facilities present	Visitor management controls easily noticeable but harmonize with the landscape; basic visitor information facilities present	On-site management controls and regulations are numerous and easy to see; more complex visitor information facilities are present	On-site management controls and regulations are both numerous and cannot go unnoticed
Land Management Practices	Land management practices are generally unnoticeable	Land management practices are noticeable but subtle	Land management practices are still subtle but are easier to see	Land uses, like grazing are evident but tend to fit in with the natural landscape	Land uses are obvious and may include measures to protect soil and vegetation from recreation use impacts; may also include water developments or mining	The land is intensively managed; multiple land management practices may occur; these practices are an integral part of the setting
Motorized Use	No motorized use allowed, no area is accessible only by horseback or foot	No motorized use allowed; accessible by foot, horse, mountain bike; non-motorized trails	Motorized use occurs, usually OHV's: 4WDs, ATVs, and motorcycles	OHV use as well as highway vehicle use occurs	Regular highway vehicles are allowed and common	Regular highway vehicles are dominant

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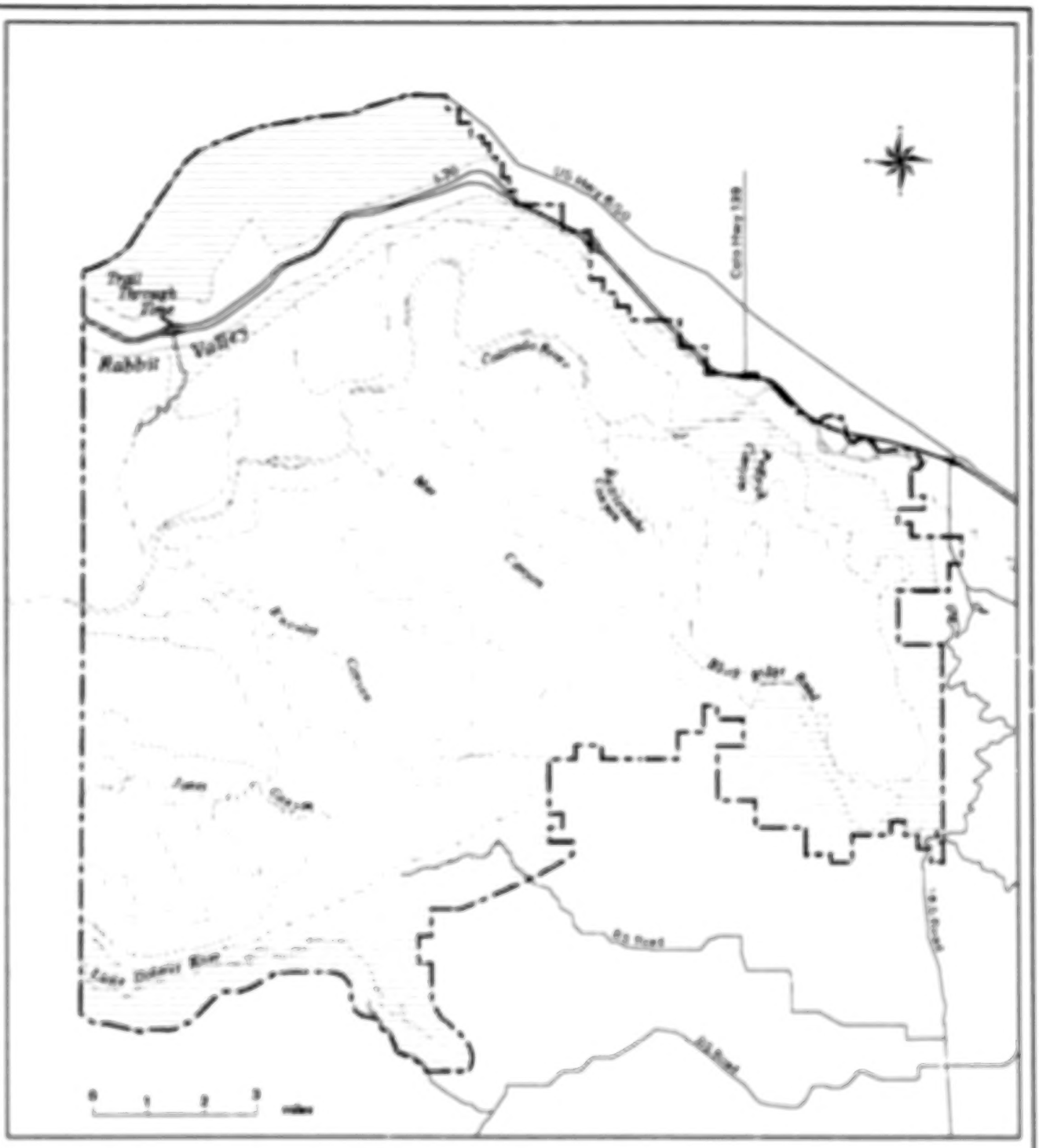

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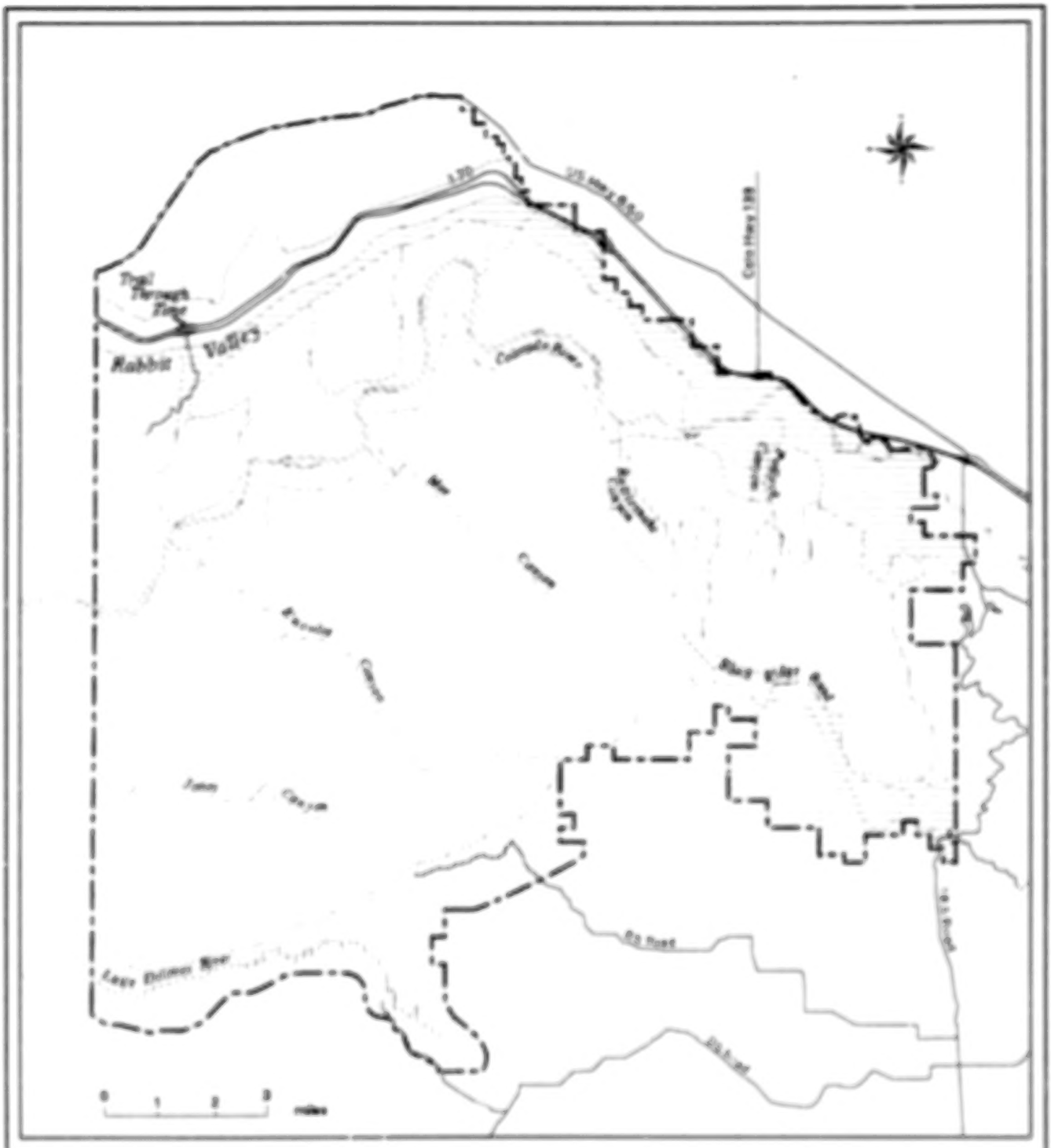
Map C-1 Targeted Physical ROS Setting Classes

- ☐ Primitive
- ☐ Middle Country
- ☐ Rural
- ☐ Back Country
- ☐ Front Country



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Map C-2 Targeted Social ROS Setting Classes

- ☐ Primitive
- ☐ Middle Country
- ☐ Rural
- ☐ Back Country
- ☐ Front Country

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Map C-3 Targeted Managerial ROS Setting Classes

☐ Primitive	☐ Middle Country	☐ Rural
☐ Back Country	☐ Front Country	▨ Urban

TABLE C-1 ..... **Targeted Management Prescriptions for the Ruby Canyon/Black Ridge Environment**

TARGETED SETTINGS	ZONES							
	Rabbit Valley			Mary's & Lion's Loop	Ruby Canyon	Black Ridge East		Black Ridge West
	Riding Area	Trail Thru Time	McDonald Ck., Wildhorse Mesa & Rabbits Ear			South-western Perimeter	Pollock Canyon Complex	
The LAND & FACILITIES: PHYSICAL SETTING								
prescribes the character of the LAND & FACILITIES including remoteness, degree of naturalness & the type and amount of facilities present								
● Urban	○	○	○	○	○	○	○	○
● Rural	○	•	○	•	•	○	•	○
● Front Country	•	○	○	•	•	•	•	•
● Middle Country	•	○	○	•	•	•	•	•
● Back Country	○	○	•	○	○	•	•	•
● Primitive	○	○	○	○	○	○	○	•
The USERS & THEIR USE: SOCIAL SETTING								
prescribes the character of HUMAN USE & OCCUPANCY including the amount of contact with other people and evidence of their having been present								
● Urban	○	○	○	○	○	○	○	○
● Rural	○	•	○	•	•	○	•	○
● Front Country	•	○	○	•	•	•	•	○
● Middle Country	•	○	○	•	•	•	•	•
● Back Country	○	○	•	○	○	•	•	•
● Primitive	○	○	○	○	○	•	○	•
The ADMINISTRATIVE / PROGRAM Environment: MANAGERIAL SETTING								
prescribes the character of the SERVICE DELIVERY SYSTEM including the degree of management control, regulation, and visitor services provided by collaborating partners								
● Urban	○	○	○	○	○	○	○	○
● Rural	•	•	○	•	•	○	•	○
● Front Country	•	○	○	•	•	•	•	•
● Middle Country	•	○	○	•	•	•	•	•
● Back Country	○	○	•	○	○	•	•	•
● Primitive	○	○	○	○	○	○	○	•

• BLM Setting a Part of this Zone

APPENDIX D

BENEFIT CHAIN OF CAUSALITY

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Targeted Recreation Settings, Activities, and Psychological Experiences and Other Benefits

RABBIT VALLEY -- Riding Area

ON-SITE ACTIVITIES

- Single and Double Track Mtn. Bike Riding & XMZ Training

&

SETTINGS -

- Physical
  - Front Country.
  - Middle Country
- Social
  - Front Country.
  - Middle Country
- Managerial
  - Rural.
  - Front Country.
  - Middle Country

- Setting Names:
  - Urban
  - Rural
  - Front Country
  - Middle Country
  - Back Country
  - Primitive

ON-SITE PSYCHOLOGICAL EXPERIENCES

- Enjoying the closeness of friends and family
- Escaping everyday responsibilities for awhile/Enjoying frequent access to a range of physical exercise challenge

OTHER ON-SITE BENEFITS

- Improved opportunity to keep over-skilled groups together
- Greater nurturance of others
- Restored body from persistent fatigue
- Restored mind from unwanted stress
- Enhanced sense of freedom
- Improved self reliance
- Improved opportunity for differently skilled individuals to exercise
- Improved physical fitness/ Better health maintenance

OTHER SUBSEQUENT OFF-SITE BENEFITS

- Maintained and enhanced group cohesion & family bonding
- Reduced numbers of at risk youth
- Improved parenting
- Greater nurturance of others
  - Improved functioning in family and community
- Restored body from persistent fatigue
- Restored mind from unwanted stress
- Enhanced sense of freedom
- Improved sense of control over one's life
  - Greater cultivation of outdoor oriented lifestyle
  - Increased quality of life
  - Heightened sense of community pride and satisfaction
- Improved physical fitness and better health maintenance

RABBIT VALLEY -- Riding Area (continued)

ON-SITE ACTIVITIES	ON-SITE PSYCHOLOGICAL EXPERIENCES	OTHER ON-SITE BENEFITS	OTHER SUBSEQUENT OFF-SITE BENEFITS
• Single and Double Track Mountain Bike Riding & OHV Driving (continued)	• Enjoying group outdoor events	> • Maintained and enhanced group cohesion and family bonding	> • Maintained and enhanced group cohesion and family bonding
		> • Greater environmental awareness & sensitivity	> • Enhanced environmental stewardship ethic
		> • Improved knowledge, skills & self confidence	> • Improved knowledge, skills & self-confidence
&		> • Improved physical fitness/ Better health maintenance	> • Improved physical fitness/ Better health maintenance
			> • Greater cultivation of outdoor oriented lifestyle
			> • Heightened sense of community pride and satisfaction
SETTINGS • Same settings as above		• Increased value added to local-regional economy	> • Positive contributions to local regional economic stability
	• Enjoying learning outdoor recreation & outdoor social skills	> • Improved leadership abilities	> • Improved leadership abilities
		> • Improved outdoor knowledge, skills & self-confidence	> • Improved outdoor knowledge, skills & self-confidence
			> • Greater cultivation of outdoor-oriented lifestyle
		> • Greater sensitivity to the recreational preferences of others	> • Improved tolerance of others

RABBIT VALLEY -- Riding Area (continued)

Page 1 of 1

OFF-SITE ACTIVITIES

- Single and Double Track Mountain Bike Riders & ORV Enthusiasts Seeking Support Services

SETTINGS

- All Grand Valley Communities

OFF-SITE PSYCHOLOGICAL EXPERIENCES
(i.e., within local communities)

- Increasing knowledge of visitor information about area recreation routine attractions and benefit opportunities

OTHER OFF-SITE BENEFITS

- Well informed & more responsible visitors
- Enhanced ability for visitors to more easily find areas offering what they want

OTHER ENVIRONMENT OFF-SITE BENEFITS

- Greater environmental stewardship

Targeted Recreation Settings, Activities, and Psychological Experiences and Other Benefits

RABBIT VALLEY -- Trail Thru Time

ON-SITE ACTIVITIES

- Dinosaur Fossil Viewing

&

SETTINGS

- Physical Rural
- Social Rural
- Managerial Rural

- Setting Names
- Urban
- Rural
- Front Country
- Middle Country
- Back Country
- Primitive

ON-SITE PSYCHOLOGICAL EXPERIENCES

- Enjoying directed experiential learning about dinosaur ecology and area geology

- Enjoying viewing/examining dinosaur fossils on your own in their natural setting

OTHER > ON-SITE BENEFITS

- Heightened awareness and improved understanding and appreciation of how dinosaurs lived, died and are still preserved
- Improved paleo curation skills
- Increased value added to local regional economy
- Greater appreciation of dinosaur fossils in their natural setting
- Greater appreciation of paleo's contribution to experiential learning

OTHER > SUBSEQUENT OFF-SITE BENEFITS

- Greater overall awareness and understanding of and sensitivity to paleontology
- Greater cognitive efficiency
- Increased artistic self-expression
- Maintained & enhanced group cohesion and family bonding
- Improved paleo curation skills
  - Greater community involvement in paleo issues
  - Reduced numbers of at-risk youth
  - Heightened sense of community pride and satisfaction
- Positive contributions to local regional economic stability
- Greater appreciation of dinosaur fossils in their natural setting
  - Greater sense of stewardship for in-situ paleontology
  - Greater overall awareness and understanding of and sensitivity to paleontology
- Greater appreciation of paleo's contribution to experiential learning

RABBIT VALLEY -- Trail Thru Time (continued)

ON-SITE ACTIVITIES

- Dinosaur Fossil Viewing (continued)

SETTINGS

- Same settings as above

ON-SITE PSYCHOLOGICAL EXPERIENCES

- Enjoying viewing/examining dinosaur fossils on your own in their natural setting (continued)

- Enjoying meeting new people having similar interests

OTHER ON-SITE BENEFITS

- Restored mind from unwanted stress
- Increased value added to local regional economy
- Improved knowledge of area paleontology/geology
- Improved understanding of other people
- Improved social cohesion with people of the community having similar interests

OTHER CONSEQUENT OFF-SITE BENEFITS

- Restored mind from unwanted stress
  - Heightened sense of community pride and satisfaction
- Positive contribution to local regional economic stability
- Improved knowledge of area paleontology/geology
- Improved understanding of other people
- Improved social cohesion with people of the community having similar interests
  - Greater community involvement in policy issues
  - Heightened sense of community pride and satisfaction

RABBIT VALLEY -- Trail Thru Time (continued)

OFF-SITE ACTIVITIES

OFF-SITE BENEFICIAL EXPERIENCES (i.e., within local communities)

OTHER OFF-SITE BENEFITS

OTHER SUBSEQUENT OFF-SITE BENEFITS

- Students Doing Outdoor Studies
  - Getting excited about expanding the classroom to include an actual dinosaur quarry
    - More highly stimulated students
      - Greater scholarship and a more positive mental attitude about learning
- Visiting Devil's Canyon Learning Center
  - Enjoying the "Jurassic Park" Experience
    - Heightened awareness and improved understanding and appreciation of how dinosaurs lived, died, and are still preserved
      - Heightened sense of community pride and satisfaction
      - Increased value added to local-regional economy
- &
  - Accessing descriptive visitor information about area recreation-tourism attractions and Benefit Opportunities
    - Well-informed & more responsible visitors
      - Greater environmental stewardship
    - Enhanced ability for visitors to more easily find areas offering what they want

SETTINGS

- All Grand Valley Communities
  - Enjoying area accommodations & restaurants
    - Satisfied guests
      - Increased value added to local-regional economy

Targeted Recreation Settings, Activities, and Psychological Experiences and Other Benefits

RABBIT VALLEY -- McDonald Creek, Wildhorse Mesa & Rabbits Ear Mesa

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ON-SITE ACTIVITIES

- Day Hiking
- Horseback Riding & Rock Art Viewing

&

SETTINGS -

- Physical
  - Back Country
- Social
  - Back Country
- Managerial
  - Back Country

- Setting Blanks
  - Urban
  - Rural
  - Front Country
  - Middle Country
  - Back Country
  - Primitive

ON-SITE PSYCHOLOGICAL EXPERIENCES

- Enjoying canyon, river & rock art aesthetics
- Enjoying the close sense of friends and family
- Experiencing/contemplating man's relationship with the land (Rabbits Ear)

OTHER ON-SITE BENEFITS

- Greater aesthetic appreciation
- Restored mind from unwanted stress
- Maintained & enhanced group cohesion and family bonding
- Greater nurturance of others
- Improved ability to relate to ranching and rural cultures
- Greater sensitivity to local traditional cultures
- Enhanced sense of stewardship for private land & respect for traditional cultures

OTHER SUBSEQUENT OFF-SITE BENEFITS

- Greater aesthetic appreciation
- Greater environmental awareness & sensitivity
- Restored mind from unwanted stress
- Maintained and enhanced group cohesion & family bonding
- Reduced numbers of at risk youth
- Improved parenting
- Greater nurturance of others
- Improved functioning of individuals in family and community
- Improved ability to relate to ranching and rural cultures
- Improved sensitivity to local traditional cultures
- Improved understanding of human dependency on the land
- Better community integration
- Greater tolerance among traditional & new users
- Enhanced sense of stewardship for private land & respect for traditional cultures

RABBIT VALLEY -- McDonald Creek, Wildhorse Mesa & Rabbits Ear Mesa

ON-SITE ACTIVITIES	ON-SITE PSYCHOLOGICAL EXPERIENCES	OTHER ON-SITE BENEFITS	OTHER SUBSEQUENT OFF-SITE BENEFITS
• Day Hiking, Horseback Riding & Rock Art Viewing (continued)	• Enjoying being able to discover & learn about earlier cultures (McDonald Creek)	• Increased knowledge of and sensitivity to earlier cultures	• Increased knowledge of and sensitivity to earlier cultures
		• Enhanced cultural resource (e.g., artifacts & sites) stewardship ethic	• Enhanced cultural resource (e.g., artifacts & sites) stewardship ethic
&			• Heightened sense of community pride and satisfaction
			• Increased resource protection
SETTINGS • Same settings as above	• Enjoying exploration	• Restored body from persistent fatigue	• Restored body from persistent fatigue
		• Restored mind from unwanted stress	• Restored mind from unwanted stress
		• Enhanced sense of freedom	• Enhanced sense of freedom
		• Improved self-reliance	• Improved self-reliance
		• Improved outdoor knowledge, skills & self-confidence	• Improved outdoor knowledge, skills & self-confidence
			• Greater cultivation of outdoor-oriented lifestyle
			• Increased quality of life
			• Heightened sense of community pride and satisfaction

RABBIT VALLEY -- McDonald Creek, Wildhorse Mesa & Rabbits Ear Mesa

OFF-SITE ACTIVITIES

- Students Doing Outdoor Studies
- Day Hikers, Horseback Riders, and Back Bay Viewers Seeking Support Services

OFF-SITE PSYCHOLOGICAL EXPERIENCES (i.e., within local communities)

- Getting excited about bringing the canyon experience into the classroom
- Accessing descriptive visitor information about area recreation, tourism attractions and benefit opportunities

OTHER OFF-SITE BENEFITS

- More highly stimulated students
- Enhanced understanding of the community's effect on the environment
- Well informed & more responsible visitors
- Enhanced ability for visitors to more easily find areas offering what they want

OTHER SUBSEQUENT OFF-SITE BENEFITS

- Greater scholarship and a more positive attitude towards learning
- Improved functioning of individuals in family and community
- Greater environmental stewardship

Targeted Recreation Settings, Activities, and Psychological Experiences and Other Benefits

MARY'S AND LION'S LOOPS

Page 1 of 3

ON-SITE ACTIVITIES	ON-SITE PSYCHOLOGICAL EXPERIENCES	OTHER ON-SITE BENEFITS	OTHER SUBSEQUENT OFF-SITE BENEFITS
• Single-track Mountain Bike Trail Riding & SETTINGS * • Physical: Rural, Front Country, Middle Country	• Meeting desired challenges/ Enjoy risk-taking canyon adventure/ Improving skills	• • Improved outdoor knowledge, skills & self confidence • • Improved problem solving skills • • Greater self assurance • • Increased adaptability	• • Improved outdoor knowledge, skills, & self confidence • • Improved problem solving skills • • Greater self assurance • • Increased adaptability • • Greater cultivation of outdoor oriented life-style • • Greater ability to re-late outdoor adventure to others
• Social: Rural, Front Country, Middle Country • Managerial Front Country, Middle Country	• Enjoying strenuous physical exercise/ testing your endurance	• • Increased value added to local-regional economy • • Improved physical fitness/ better health maintenance • • Restored body from persistent fatigue • • Restored mind from unwanted stress • • Improved self-competence • • More balanced competitive spirit	• • Increased value added to local regional economy • • Improved physical fitness/ Better health maintenance • • Restored body from persistent fatigue • • Restored mind from unwanted stress • • Diminished mental anxiety-depression • • Reduced hypertension-high blood pressure • • Improved self-competence • • More balanced competitive spirit • • Greater cultivation of outdoor-oriented lifestyle • • Increased work-produc

* Setting Names:

- Urban
- Rural
- Front Country
- Middle Country
- Back Country
- Primitive

MARY'S AND LION'S LOOPS (continued)

ON-SITE ACTIVITIES

- Simple trail Mountain Bike Trail Riding (continued)

&

SETTINGS

- Same settings as above

ON-SITE PSYCHOLOGICAL EXPERIENCES

- Releasing or reducing some built up mental tensions

- Escaping everyday responsibilities for awhile
- Quietly witnessing natural resources environments
- Enjoying frequent surprises

OTHER ○ ON-SITE BENEFITS

- • Restored mind from unwanted stress

- • Restored body from persistent fatigue
- • Restored mind from unwanted stress
- • Enhanced sense of freedom
- • Improved self reliance

OTHER ○ SUBSEQUENT OFF-SITE BENEFITS

- • Restored mind from unwanted stress
- • Diminished mental anxiety depression
- • Reduced hypertension high blood pressure
- • Improved sense of control over one's life
  - • Increased work productivity
- • Restored body from persistent fatigue
- • Restored mind from unwanted stress
- • Enhanced sense of freedom
- • Greater cultivation of outdoor oriented lifestyle
- • Increased quality of life
- • Heightened sense of community pride and participation

MARY'S AND LION'S LOOPS (continued)

OFF-SITE ACTIVITIES	OFF-SITE PSYCHOLOGICAL EXPERIENCES (i.e., within local communities)	OTHER OFF-SITE BENEFITS	OTHER SUBSEQUENT OFF-SITE BENEFITS
• Single-track Mountain Bike Trail Riders Seeking Support Services	• Receiving quality mountain bike service & equipment support	→ • Well-equipped customers	→ • Increased value added to local-regional economy • Heightened sense of community pride and satisfaction
	• Enjoying area accommodations & restaurants	→ • Satisfied guests	→ • Greater participation of outdoor-oriented lifestyle → • Increased quality of life → • Positive contribution to local-regional economic stability
SETTINGS • All Grand Valley Communities	• Accessing descriptive visitor information about area recreation-tourism attractions and Benefit Opportunities	→ • Well informed & more responsible visitors	→ • Greater environmental stewardship
		→ • Enhanced ability for visitors to more easily find areas offering what they want	

Targeted Recreation Settings, Activities, and Psychological Experiences and Other Benefits

RUBY CANYON

ON-SITE ACTIVITIES	ON-SITE PSYCHOLOGICAL EXPERIENCES	OTHER • ON-SITE BENEFITS	OTHER • SUBSEQUENT OFF-SITE BENEFITS
• Boating and Day Hiking Side Canyons & SETTINGS * • Physical Front Country Middle Country	• Meeting desired challenges/ Enjoy risk taking rivers and canyon adventure	- + Improved outdoor knowledge skills & self confidence - + Improved problem solving skills - + Greater self assurance - + Increased adaptability	- + Improved outdoor knowledge skills & self confidence - + Improved problem solving skills - + Greater self assurance - + Increased adaptability - + Greater cultivation of outdoor oriented lifestyle - + Greater ability to relate outdoor adventure to others
• Social Rural, Front Country Middle Country		- + Increased value added to local regional economy	- + Positive contributions to local-regional economic economic stability
• Managerial Rural Front Country Middle Country	• Savoring river canyon aesthetics	- + Creates aesthetic appreciation - + Restored mind from unwanted stress - + Reduced hypertension high blood pressure	- + Creates aesthetic appreciation - + Creates environmental awareness & sensitivity - + Restored mind from unwanted stress - + Reduced hypertension high blood pressure - + Improved physical and mental health
• Setting Names • Urban • Rural • Front Country • Middle Country • Back Country • Primitive	• Enjoying the close ones of friends and family-reinforcing personal and family values	- + Maintained & enhanced group cohesion & family bonding	- + Maintained & enhanced group cohesion & family bonding - + Reduced numbers of at risk youth - + Improved parenting

RUBY CANYON (continued)

ON-SITE ACTIVITIES	ON-SITE PSYCHOLOGICAL EXPERIENCES	OTHER ON-SITE BENEFITS	OTHER SUBSEQUENT OFF-SITE BENEFITS
• Boating and Day Hiking Side Canyons (continued)	• Enjoying the close sense of friends and family; reflecting on personal and family values (continued)	• Greater nurturance of others • Clearer personal values	• Greater nurturance of others • Clearer personal values • Greater self assurance → Improved functioning of individuals in family & community
&			
	• Enjoying mental & physical rest	• Reduced hypertension high blood pressure • Restored mind from unwanted stress • Diminished mental anxiety depression • Restored body from persistent fatigue	• Reduced hypertension high blood pressure • Restored mind from unwanted stress • Diminished mental anxiety depression • Restored body from persistent fatigue → Improved mental & physical health
SETTINGS • Same settings as above	• Enjoying learning outdoor recreation & outdoor social skills	• Improved leadership abilities • Improved outdoor knowledge, skills & self confidence • Greater sensitivity to others' recreation preferences	• Improved leadership abilities • Improved outdoor knowledge skills & self confidence → Greater cultivation of an outdoor oriented lifestyle • Improved tolerance of others

RUBY CANYON (continued)

OFF-SITE ACTIVITIES

- Boaters and Side Canyon Day Hikers Seeking Support Services

OFF-SITE PSYCHOLOGICAL EXPERIENCES
(i.e., within local communities)

- Receiving quality boating and hiking gear service & equipment support
- Enjoying area accommodations & restaurants

OTHER OFF-SITE BENEFITS

- well equipped customers
- Satisfied guests

OTHER SUBSEQUENT OFF-SITE BENEFITS

- Increased value added to local economy
- Heightened sense of community pride and satisfaction
  - Greater cultivation of outdoor oriented lifestyle
  - Increased quality of life
  - Positive contributions to local regional economic stability

SETTINGS

- All Grand Valley Communities

- Screening descriptive visitor information about area recreation tourism attractions and benefit opportunities
  - Well informed & more responsible visitors
    - Enhanced ability for visitors to more easily find areas offering what they want
  - Greater environmental stewardship

Targeted Recreation Settings, Activities, and Psychological Experiences and Other Benefits

BLACK RIDGE EAST -- Southwestern Perimeter & Arches

Page 1 of 1

ON-SITE ACTIVITIES	ON-SITE PSYCHOLOGICAL EXPERIENCES	OTHER > ON-SITE BENEFITS	OTHER > SUBSEQUENT OFF-SITE BENEFITS
• Viewing Arches, Mtn. Bike Riding & OHV Driving & SETTINGS •	• Enjoying the closeness of friends and family	> • Maintained and enhanced group cohesion & family bonding	> • Maintained and enhanced group cohesion & family bonding > • Reduced numbers of at risk youth > • Improved parenting
		> • Greater nurturance of others	> • Improved functioning of individuals in family and community
• Physical Front Country Middle C. Back C.	• Enjoying viewing & exploring the arches	> • Greater aesthetic appreciation	> • Greater aesthetic appreciation > • Greater environmental awareness & sensitivity
• Social Front C. Middle C. Back C. Primitive		> • Improved learning of natural processes	> • Improved relationship with the natural world
• Managerial Front C. Middle C. Back C. Primitive		> • Enhanced awareness of the arches as a special place	> • Enhanced sense of place ethic > • Improved environmental stewardship > • Improved community involvement in environmental issues > • Heightened sense of community pride and satisfaction > • Improved economic stability from tourism
• Setting Domain ● Urban ● Rural ● Front Country ● Middle Country ● Back Country ● Primitive	> • Increased value added to local regional economy	> • Positive contributions to local regional economic stability	

BLACK RIDGE EAST -- Southwestern Perimeter & Arches (continued)

ON-SITE ACTIVITIES

- Viewing Arches, Mtns, Bike Riding & Hiking (continued)

&

SETTINGS

- Same setting as above

ON-SITE PSYCHOLOGICAL EXPERIENCES

- Enjoying artistic self expression
- Enjoying learning a new sport/activity take on the Slickrock arches

OTHER ON-SITE BENEFITS

- Increased artistic self expression
- Greater sense of freedom in being able to get to this special place
  - Improved relationship with the natural world

OTHER SUBSEQUENT OFF-SITE BENEFITS

- Enhanced awareness of the arches as a special place
- Greater community appreciation of the area
  - Heightened sense of community pride and satisfaction
- Greater cultivation of outdoor oriented lifestyle
- Enhanced group cohesion and family bonding

BLACK RIDGE EAST -- Southwestern Perimeter & Arches (continued)

OFF-SITE ACTIVITIES
OFF-SITE PSYCHOLOGICAL EXPERIENCES (i.e., within local communities)
OTHER OFF-SITE BENEFITS
OTHER SUBSEQUENT OFF-SITE BENEFITS
• Touring Visitors Seeking Support Services
• Enjoying having access to different types of tours to the Arches
• Greater visitor satisfaction in being able to do desired trips
• Increased value added to local regional economy
• Positive contribution to local regional economic stability
• Heightened sense of community pride and satisfaction
• Greater community involvement in environmental issues
• Greater cultivation of outdoor-oriented lifestyle
• Increased quality of life
• Enjoying area accommodations & restaurants
• Satisfied guests
• Increased value added to local regional economy
• Positive contribution to local regional economy
SETTINGS
• All Grand Valley Communities
• Accessing descriptive visitor information about area recreation tourism attractions and benefit opportunities
• Well informed & more responsible visitors
• Enhanced ability for visitors to more easily find areas offering what they want
• Greater environmental stewardship

Targeted Recreation Settings, Activities, and Psychological Experiences and Other Benefits

BLACK RIDGE EAST -- Pollock Canyon Complex

ON-SITE ACTIVITIES	ON-SITE PSYCHOLOGICAL EXPERIENCES	OTHER ON-SITE BENEFITS	OTHER DOWNSTREAM OFF-SITE BENEFITS
• Day Hiking, Non-Wilderness Mtn. Bike Riding, & Outdoor School Studies & SETTINGS * • Physical Rural Front C Middle C Back C • Social Rural Front C Middle C Back C • Managerial Rural Front Country Back Country	• Savoring area rangers roaming aesthetics • Enhancing or reducing some built up mental tensions	- • Greater aesthetic appreciation - • Greater environ mental awareness and sensitivity - • Restored mind from unwanted stress - • Restored mind from unwanted stress	- • Greater aesthetic appreciation • Enhanced environmental stewardship ethic - • Improved maintenance of biophysical systems - • Restored mind from unwanted stress - • Restored mind from unwanted stress - • Diminished mental anxiety depression - • Reduced hypertension high blood pressure - • Improved sense of control over one's life - • Increased work productivity
• Setting Names ● Urban ● Rural ● Front Country ● Middle Country ● Back Country ● Primitive	• Enjoying learning about man's influence on the natural world and its potential beneficial influence on individuals, society and the economy	- • Improved understanding of rural urban interface & of Wilderness - • Improved understanding of how involvement in natural resource settings builds character - • Improved learning of natural processes	- • Improved understanding of human dependency on the land - • Improved Wilderness ethic - • Greater environmental stewardship - • Reduced numbers of at risk youth - • Improved relationship with the natural world

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BLACK RIDGE EAST -- Pollock Canyon Complex (continued)

ON-SITE ACTIVITIES

- Day diking & Dirt Bike/Jeeping Min. Bike Riding (continued)

SETTINGS

- Same settings as above.

ON-SITE PSYCHOLOGICAL EXPERIENCES

- Escaping everyday responsibilities for awhile/Enjoying easy access to diverse primitive and unconfined outdoor recreation environments
- Appreciating knowing others are nearby for social interaction & risk reduction

OTHER ON-SITE BENEFITS

- Restored body from persistent fatigue
- Restored mind from unwanted stress
- Greater freedom from urban living
- Improved sense of personal security
- Increased opportunity for affiliation with others

OTHER ENJOYMENT OFF-SITE BENEFITS

- Restored body from persistent fatigue
- Restored mind from unwanted stress
- Improved quality of life
- Greater cultivation of outdoor oriented lifestyle
- Greater sense of freedom to engage in outdoor pursuits
- Increased social support

BLACK RIDGE EAST -- Pollock Canyon Complex (continued)

OFF-SITE ACTIVITIES

- Students Driving Outdoor Oriented
- They Bikers Seeking Information About How To Do Trail Events Trips
- They Bikers and Mountain Bikers Seeking Support Services

OFF-SITE PSYCHOLOGICAL EXPERIENCES
(i.e., within local communities)

- Getting excited about bringing the canyon experience into the classroom
- Increasing Desire for positive information about area recreation tourism attractions and Benefit Opportunities

OTHER OFF-SITE BENEFITS

- More highly stimulated students
- Enhanced understanding of the community's effort in the environment
- Well informed & more responsible visitors
- Enhanced ability for visitors to more easily find areas offering what they want

OTHER SUBSEQUENT OFF-SITE BENEFITS

- Greater scholarship and a more positive attitude towards learning
- Improved fourth rating - individuals as members of the community
- Greater environmental stewardship

Targeted Recreation Settings, Activities, and Psychological Experiences and Other Benefits

BLACK RIDGE WEST

ON-SITE ACTIVITIES	ON-SITE PSYCHOLOGICAL EXPERIENCES	OTHER ON-SITE BENEFITS	OTHER SUBSEQUENT OFF-SITE BENEFITS
• Wilderness Backpacking & **SETTINGS** * • Physical Middle Country. Back Country. Primitive • Social Back Country. Primitive • Managerial Front Country. Middle Country. Primitive	• Meeting desired challenges/ Enjoy risk taking adventure/ Improving skills	• • Improved outdoor knowledge, skills, & self-confidence	• • Improved outdoor knowledge, skills, & self-confidence • • Greater ability to relate outdoor adventures to others
		• • Improved problem solving skills	• • Improved problem solving skills • • Greater cognitive efficiency
		• • Increased adaptability	• • Increased adaptability
		• • Greater self-assurance	• • Greater self-assurance • • Greater cultivation of outdoor oriented lifestyle
	• Savoring Wilderness aesthetics	• • Greater aesthetic appreciation	• • Greater aesthetic appreciation • • Greater environmental awareness & sensitivity
		• • Reduced hypertension-blood pressure	• • Reduced hypertension blood pressure
		• • Restored mind from unwanted stress	• • Restored mind from unwanted stress • • Improved physical & mental health
• Setting Names ● Urban ● Rural ● Front Country ● Middle Country ● Back Country ● Primitive	• Enjoying strenuous physical exercise/ testing your endurance	• • Improved physical fitness/ Better health maintenance	• • Improved physical fitness/ Better health maintenance
		• Restored body from persistent fatigue	• • Restored body from persistent fatigue
		• • Restored mind from unwanted stress	• • Restored mind from unwanted stress • • Diminished mental anxiety-depression

BLACK RIDGE WEST (continued)

ON-SITE ACTIVITIES

- Wilderness Backpacking (continued)

&

SETTINGS

- Same settings as above

ON-SITE PSYCHOLOGICAL EXPERIENCES

- Enjoying strenuous physical exercise/ testing your endurance (continued)
- Feeling good about being isolated & independent
- Enjoying reflecting on personal values

OTHER ON-SITE BENEFITS

- Improved self competence
- Greater self reliance
- Increased adaptability
- Enhanced sense of freedom
- Revamped human spirit
- Spiritual growth
- Clearer personal values

OTHER SUBSEQUENT OFF-SITE BENEFITS

- Reduced hypertension (high blood pressure)
- Improved self competence
- Increased work productivity
- Greater self reliance
- Improved sense of control over one's life
- Increased adaptability
- Enhanced sense of freedom
- Greater overall sense of personal wellness
- Spiritual growth
- Clearer personal values
- Greater self assurance

BLACK RIDGE WEST (continued)

OFF-SITE ACTIVITIES

- Wilderness Backpackers Seeking Support Services

OFF-SITE PSYCHOLOGICAL EXPERIENCES
(i.e., within local communities)

- Accessing descriptive visitor information about area recreation tourism attractions and Benefit Opportunities

OTHER OFF-SITE BENEFITS

- Well informed & more responsible visitors
  - Enhanced ability for visitors to more easily find areas offering what they want

OTHER SUBSEQUENT OFF-SITE BENEFITS

- Greater environmental stewardship

APPENDIX E

DESIRED PLANT COMMUNITY

DESIRED PLANT COMMUNITY

Desired plant community (DPC) is a description of a plant community which meets the needs for present and future uses of a particular area. DPC answers the question, what do we want the plant communities in those areas to look like in the future?

DPC helps to implement ecosystem management by being ecologically, economically, and socially sound. DPC will help assure the vegetative communities within an area are compatible with the current or potential uses of that area. DPC combines the vegetative needs of all users into a common goal rather than having separate goals for each.

The DPC for Ruby Canyon was developed by a team of individuals who have an interest in the area. Team members include recreationists, livestock operators, wildlife managers, federal and local government officials, members of environmental organizations and concerned citizens.

In 1993 an Ecological Site Inventory (ESI) was completed in the Ruby Canyon planning area. ESI is an intensive vegetative inventory that describes the present vegetative communities in the area. The use of ESI helps assure the development of realistic desired plant communities that we know can be obtained. Other vegetative studies, past or present, can also be utilized in the DPC process.

Information on occurrences from the past such as wildfires, prescribed burns, chainings, seedings, and other disturbances can help determine why areas look like they do.

The DPC will guide us in future management of the area. It will help in determining which management actions or activities may or may not lead us toward our landscape goal. DPC will give us a better understanding on when and where to use the management tools available to us such as fire, reseeding, grazing management or other vegetation manipulation practices. DPC will assure that vegetative objectives are ecologically based and are attainable.

Ruby Canyon Desired Plant Community

Following is the DPC for each of the management zones. The DPC will be described for each ecological site type. Ecological sites are areas that have a potential for producing similar plant communities based upon similar soils, climate and, topography. Each DPC description for an ecological site will contain a table illustrating the current percent composition of trees, shrubs, forbs, warm season grasses and cool season grasses for each site writeup area (SWA) and the **desired** percent composition. Also

included is the ecological status (E = Early, M = Mid, L = Late) in relation to the potential natural community (PNC). Following the table are general notes pertaining to the ecological site. Map (EIS map in envelope) located in the back of this document identifies the location of each SWA and the respective ecological site.

The effort focused on describing a DFC description that allowed for changes to occur but still be acceptable. Also the description allowed for diversity in seral stages within ecological site types, understanding that this diversity was desirable as well. SWA's not listed in the DPC description were either small units or areas of little concern.

The DPC team felt there were a few points that need to be made which are important in understanding the DPC and need to be considered in the future use of it.

- The ESI was completed in an above average year precipitation and production wise.
- It is important to remember that the percent composition figures are derived from production figures for each SWA.
- Pinyon-Juniper production data from the ESI were obtained from charts derived by the Natural Resource Conservation Service and are based upon tree size and density of foliage.
- Sagebrush production figures from the ESI is total leaf production not just current annual growth.
- Half-shrubs are included with shrubs.
- From the teams' standpoint both cheatgrass and cryptogamic soils are present and will continue to be part of most vegetative communities at some level. Management should discourage any increase in cheatgrass.
- Photographs of various sagebrush composition levels could be useful in illustrating to future personnel exactly what the defined DPC limits may look like, i.e., it is difficult to visualize what 70 percent composition might look like.

NORTH OF RIVER

Overall the DPC team was satisfied with the current vegetative make-up and condition in the north zone. In general, there were two major areas of focus: 1) Decrease the cheatgrass composition while increasing perennial grasses, and 2) Maintain the shrub and forb component for antelope habitat.

Ecological Site: **Alkaline Slopes # 297**

Vegetation Type	SWA #						DPC Composition (%)
	35	40	47	100			
	Current Species Composition (%)						
Trees	0	0	0	0			0
Shrubs	11	28	47	39			10 - 50
Forbs	7	22	26	1			5 - 25
W. Grasses	9	14	9	33			5 - 40
C. Grasses	15	2	0	3			5 - 20
Seral Stage	E	M	M	L			E, M or L

Notes:
- Overall, increase perennial grasses particularly cool season and decrease cheatgrass.
- Prefer a mixture of seral stages.
- Maintain shrub and forb components for antelope forage.

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Ecological Site: **Semidesert Loam # 325**

Vegetation Type	SWA #						DPC Composition (%)
	39	48					
	Current Species Composition (%)						
Trees	0	0					0
Shrubs	23	4					4 - 23
Forbs	15	17					15 - 20
W. Grasses	39	11					10 - 45
C. Grasses	3	64					5 - 65
Seral Stage	M	L					M or L

Notes
- Prefer a mixture of mid and late seral stages to provide diversity of vegetation types
- A desirable mix of shrubs and grasses are present although an increase in cool season grasses in SWA #39 and shrubs in SWA #48 is desired.

Ecological Site: Semidesert Juniper # 329

Vegetation Type	SWA #						DPC Composition (%)
	1	6	8	14	16	19	
	Current Species Composition (%)						
Trees	0	3	59	72	52	6	0 - 40
Shrubs	47	85	3	1	7	15	30 - 70
Forbs	31	0	1	2	18	23	1 - 15
W. Grasses	2	2	0	1	2	6	10 - 50
C. Grasses	1	5	36	14	21	45	10 - 50
Seral Stage	M	M	L	M	L	M	M or L

Ecological #Site 329 (cont.)

Vegetation Type	SWA #						DPC Composition (%)
	22	25	28	32	33	34	
	Current Species Composition (%)						
Trees	85	0	15	18	35	10	0 - 40
Shrubs	1	72	64	52	50	39	30 - 70
Forbs	7	1	0	14	4	7	1 - 15
W. Grasses	0	0	2	0	4	12	10 - 50
C. Grasses	3	20	3	8	2	3	10 - 50
Seral Stage	M	L	L	L	L	L	M or L

Vegetation Type	SWA #						DPC Composition (%)
	36	105 141	106	109	110		
	Current Species Composition (%)						
Trees	38	48	31	52	0		0 - 40
Shrubs	39	34	59	29	57		30 - 70
Forbs	3	5	0	5	6		1 - 15
W. Grasses	0	2	1	3	12		10 - 50
C. Grasses	12	10	3	11	15		10 - 50
Seral Stage	L	L	M	L	M		M or L

Notes:

- Prefer a mixture of mid and late seral stages to provide diversity of vegetation types.
- Most SWA's need an increase in perennial grasses.

Ecological Site: Loamy Saltdesert # 401

Vegetation Type	SWA #						DPC Composition (%)
	24	27	30	31	49	101	
	Current Species Composition (%)						
Trees	0	0	0	0	0	0	0
Shrubs	22	49	31	4	0	52	4 - 35
Forbs	6	0	10	48	20	4	1 - 15
W. Grasses	20	13	12	0	3	26	25 - 60
C. Grasses	12	2	3	29	50	10	15 - 60
Seral Stage	M	M	M	E	--	L	E, M or L

Notes
-In SWA 27 and 31 maintain Elsa at current percentage and maintain low plant heights for prairie dog habitat.
-Maintain SWA #114 in Late Seral.
-Prefer a mixture of seral stages for diversity.
-Decrease cheatgrass. Cheatgrass composition ranges from 10 to 40% in these SWA's.
-No seral stage is listed for SWA 49 due to the large amount of crested wheatgrass.

Ecological Site: Sandy Saltdesert # 402

Vegetation Type	SWA #						DPC Composition (%)
	2	4	5	10	20		
	Current Species Composition (%)						
Trees	0	0	0	0	0		0
Shrubs	12	37	69	5	3		5 - 45
Forbs	11	1	14	18	22		5 - 15
W. Grasses	0	3	1	9	8		10 - 25
C. Grasses	0	5	3	16	6		10 - 25
Seral Stage	E	E	E	M	E		M or L

Ecological Site # 402 (cont.)

Vegetation Type	SWA #						DPC Composition (%)
	38	154 160	165 166				
	Current Species Composition (%)						
Trees	0	0	0				0
Shrubs	50	4	25				5 - 45
Forbs	18	13	8				5 - 15
W. Grasses	8	8	21				10 - 25
C. Grasses	7	16	9				10 - 25
Seral Stage	E	M	M				M or L

Notes:
- Increase perennial grass composition and decrease amount of cheatgrass. Cheatgrass composition ranges from 14 to 76%.
- Prefer mid and late seral stages, provides diversity of vegetation types.

Ecological Site: Stony Saltdesert # 404

Vegetation Type	SWA #						DPC Composition (%)
	12	102	104	153			
	Current Species Composition (%)						
Trees	0	0	0	0			0
Shrubs	44	73	66	66			40 - 70
Forbs	33	4	11	11			5 - 20
W. Grasses	10	7	10	10			5 - 25
C. Grasses	9	12	0	0			5 - 25
Seral Stage	M	M	M	M			M or L

Notes:
- Increase cool season grasses in #104 and #153.
- Prefer mid or late seral stages.
- Maintain at least a 25% composition of greasewood in SWA #153.

Ecological Site: Saltdesert Breaks #406

Vegetation Type	SWA #						DPC Composition (%)
	7	17	26	46	108	115	
	Current Species Composition (%)						
Trees	0	12	0	28	0	0	5 - 20
Shrubs	50	16	44	12	34	44	10 - 45
Forbs	29	11	11	13	18	11	5 - 20
W. Grasses	4	3	6	28	7	6	5 - 50
C. Grasses	12	31	20	1	13	20	5 - 50
Seral Stage	L	L	L	M	L	L	M or L

Notes:
- Maintain SWA # 17 in late seral
- Prefer mid or late seral stages, provides diversity of vegetation types.
- Increase perennial grasses and decrease amount of cheatgrass.

Ecological Site: Silty Saltdesert # 410

Vegetation Type	SWA #						DPC Composition (%)
	42	43	45				
	Current Species Composition (%)						
Trees	0	0	0				0
Shrubs	19	72	41				20 - 60
Forbs	18	10	11				10 - 20
W. Grasses	18	0	28				10 - 20
C. Grasses	23	19	0				10 - 25
Seral Stage	L	L	L				L

Notes:
- Prefer late seral stage, provides diversity of vegetation types.
- Maintain SWA #45 in late seral stage.

Ecological Site: Foothills Juniper # 447

Vegetation Type	SWA #						DPC Composition (%)
	9	13	15	18	21	23	
	Current Species Composition (%)						
Trees	70	51	80	39	50	66	39 - 80
Shrubs	1	23	9	45	35	15	10 - 30
Forbs	13	5	1	15	4	7	5 - 15
W. Grasses	1	0	1	0	2	0	10 - 30
C. Grasses	16	4	1	1	1	9	10 - 30
Seral Stage	PNC	L	L	L	L	PNC	PNC or L

Vegetation Type	SWA #						DPC Composition (%)
	29	37	41	103			
	Current Species Composition (%)						
Trees	55	60	77	55			39 - 80
Shrubs	36	14	18	39			10 - 30
Forbs	0	5	1	7			5 - 15
W. Grasses	3	3	0	0			10 - 30
C. Grasses	0	2	1	0			10 - 30
Seral Stage	L	L	L	L			L

Notes:

- Maintain scattered density of juniper for birds with varied shrub/herb understory in SWA's 9, 37, 41, 110.
- Maintain juniper for sensitive bird species and the rare plants Amsonia jonesii and Cryptantha osterhoutii in SWA's 15 and 21.
- Increase perennial grass cover.

Colorado River

The desired riparian plant communities for the Colorado River are diverse, that is, have a variety of species and age classes. Diversity within riparian areas is primarily a function of hydrology. Diverse plant communities are desirable because they provide scenery, wildlife viewing opportunities, shade and occasional open river banks for recreational use by people. Food, cover, nesting habitat, and travel corridors are provided for wildlife. Livestock utilize these areas for forage and cover. Water quality is improved by the shade moderating water temperatures, and reduced sediment loads resulting from vegetation trapping sediment and stabilizing banks.

The riparian vegetative inventory on the Colorado River was less intensive than the ESI used in the uplands. This inventory consisted of defining the following parameters for each SWA along the river. These parameters were selected based on major vegetative concerns. Table 1 summarizes these parameters for each SWA within the Colorado River inventory.

- Dominant vegetation. The three most dominant species where identified.
- Mature cottonwoods. The presence or absence of mature cottonwoods was noted.
- Cottonwood regeneration. Age classes of cottonwood trees was noted particularly saplings.
- Exotic species and weeds. The presence of exotic species and weeds was noted as well as the degree of presence e.g. high, medium, low.

Table 1

SWA #	Species #1	Species #2	Species #3	M *	C **	W ***
L1	Pofr	Tamarix sp.	Disp	Y	Y	L
L2	Rhtr	Caca	Prunus sp.	N	Y	L
L3	Tamarix sp.	Rhtr	Salix sp.	N	Y	L
L4	Tamarix sp.	Pofr	Rhtr	Y	Y	H
L5	Tamarix sp.	Salix sp.	Carex sp.	N	Y	L
L6	Rhtr	Salix sp.	Caca	N	Y	L
L7	Tamarix sp.	Brte	Artr	N	Y	M
L8	Salix sp.	Carex sp.	Caca	N	Y	L
L9	Tamarix sp.	Salix sp.	Pofr	N	Y	L
L10	Tamarix sp.	Salix sp.	Rhtr	N	Y	M
L11	Tamarix sp.	Salix sp.	Pofr	Y	Y	L
L12	Pofr	Tamarix sp.	Spai	Y	Y	M
L13	Salix sp.	Tamarix sp.	Carex sp.	N	N	L
L14	Salix sp.	Rhtr	Tamarix sp.	N	Y	L
L15	Tamarix sp.	Artr	Pofr	Y	Y	L
L16	Salix sp.	Tamarix sp.	Brte	N	Y	H
L18	Salix sp.	Pofr	Tamarix sp.	N	Y	L
L19	Salix sp.	Pofr	Carex sp.	Y	Y	L
L20	Brte	Pofr		Y	Y	M
L21	Salix sp.	Tamarix sp.	Rhtr	Y	Y	L
L22	Pofr	Brte		Y	Y	L
L23	Salix sp.	Tamarix sp.	Pofr	Y	Y	L
L24	Salix sp.	Tamarix sp.	Carex sp.	N	Y	L
R1	Tamarix sp.	Pofr	Disp	Y	Y	H
R2	Salix sp.	Carex sp.	Juncus sp.	N	N	L
R3	Pofr	Elan	Tamarix sp.	Y	N	M
R4	Pofr	Salix sp.		Y	Y	L
R5	Pofr	Tamarix sp.	Carex sp.	Y	Y	M
R6	Pofr	Tamarix sp.	Salix sp.	Y	Y	M
R7	Caca	Salix sp.	Rhtr	N	Y	L
R8	Tamarix sp.	Salix sp.	Pofr	Y	Y	L
R9	Tamarix sp.	Rhtr	Pofr	N	Y	L
R10	Tamarix sp.	Salix sp.	Rhtr	N	Y	L
R11	Tamarix sp.	Salix sp.	Rhtr	N	Y	L
R12	Tamarix sp.	Salix sp.	Rhtr	N	Y	L
R13	Tamarix sp.	Salix sp.	Rhtr	N	Y	L
R14	Tamarix sp.	Salix sp.	Rhtr	Y	Y	L
R15	Rhtr	Tamarix sp.	Chna	Y	N	L
R16	Rhtr	Salix sp.		N	N	L
R17	Tamarix sp.	Rhtr	Pofr	Y	Y	M

Table 1 (cont.)

SWA #	Species #1	Species #2	Species #3	M *	C **	W ***
R18	Pofr	Tamarix sp.	Rhtr	Y	Y	M
R19	Tamarix sp.	Salix sp.	Rhtr	N	N	L
R20	Tamarix sp.	Salix sp.	Chna	N	N	L
R21	Tamarix sp.	Elan	Salix sp.	N	Y	L
R22	Salix sp.	Pofr	Tamarix sp.	N	Y	M
R23	Rhtr	Tamarix sp.	Salix sp.	Y	N	L
R24	Tamarix sp.	Rhtr	Salix sp.	Y	N	L
R25	Pofr	Tamarix sp.	Salix sp.	Y	Y	L
R26	Tamarix sp.	Salix sp.	Pofr	Y	Y	L
R27	Phco	Salix sp.		N	N	L
R28	Tamarix sp.	Salix sp.		N	N	L
R29	Salix sp.	Tamarix sp.		N	N	L
R30	Juniper sp.			N	N	L
R31	Tamarix sp.	Brte		N	N	L
R32	Rhtr	Tamarix sp.	Disp	N	N	L
R33	Salix sp.	Rhtr		N	N	L
R34	Pofr	Tamarix sp.	Salix sp.	Y	Y	L
R35	Rhtr	Tamarix sp.	Salix sp.	N	N	L
R36	Rhtr	Tamarix sp.	Pofr	Y	Y	L
R37	Rhtr	Pofr	Tamarix sp.	Y	Y	L

Species Key: Pofr = Fremont Cottonwood, Tamarix sp. = Saltcedar, Disp = Inland saltgrass, Rhtr = Skunkbush Sumac, Ca[illegible] = Reedgrass, Prunus sp. = Wildrose, Salix sp. = Willow, Carex sp. = Sedge, Brte = Cheatgrass, Spai = Alkali Sacaton, Juncus = Rush, Elan = Russian Olive, Chna = Rubber Rabbitbrush, Phco = Canarygrass

* Presence of Mature Cottonwoods
Y = Yes
N = No

** Cottonwood Regeneration
Y = Yes
N = No

*** Weed Status
H = High
M = Moderate
L = Low

Map E-1 page E-13, Map E-2 page E-14, and Map E-3 page E-15 illustrate the presence of mature cottonwoods, cottonwood regeneration and weed status in relation to the respective SWA along the Colorado River

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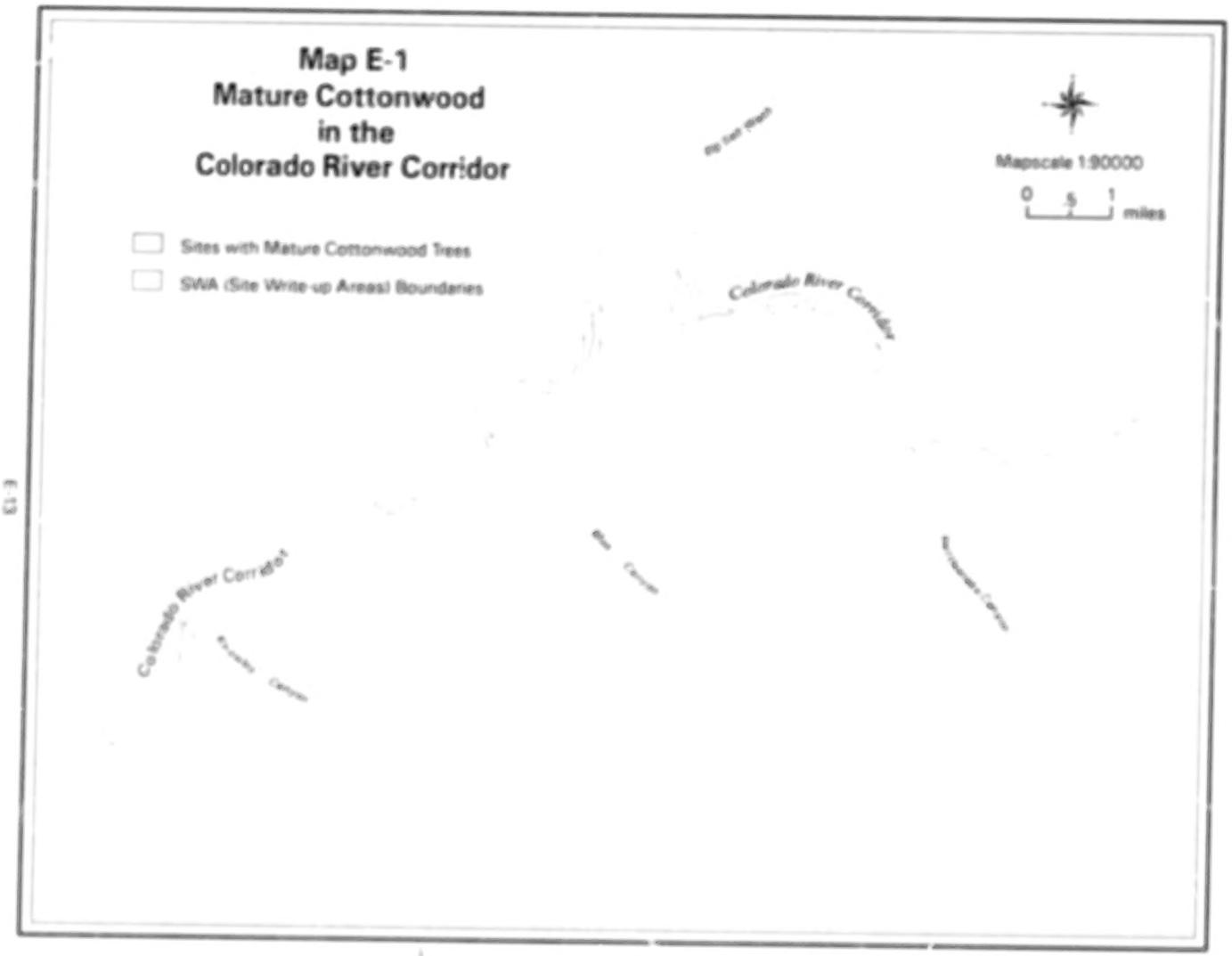
Map E-1
Mature Cottonwood
in the
Colorado River Corridor
Sites with Mature Cottonwood Trees
SWA (Site Write-up Areas) Boundaries
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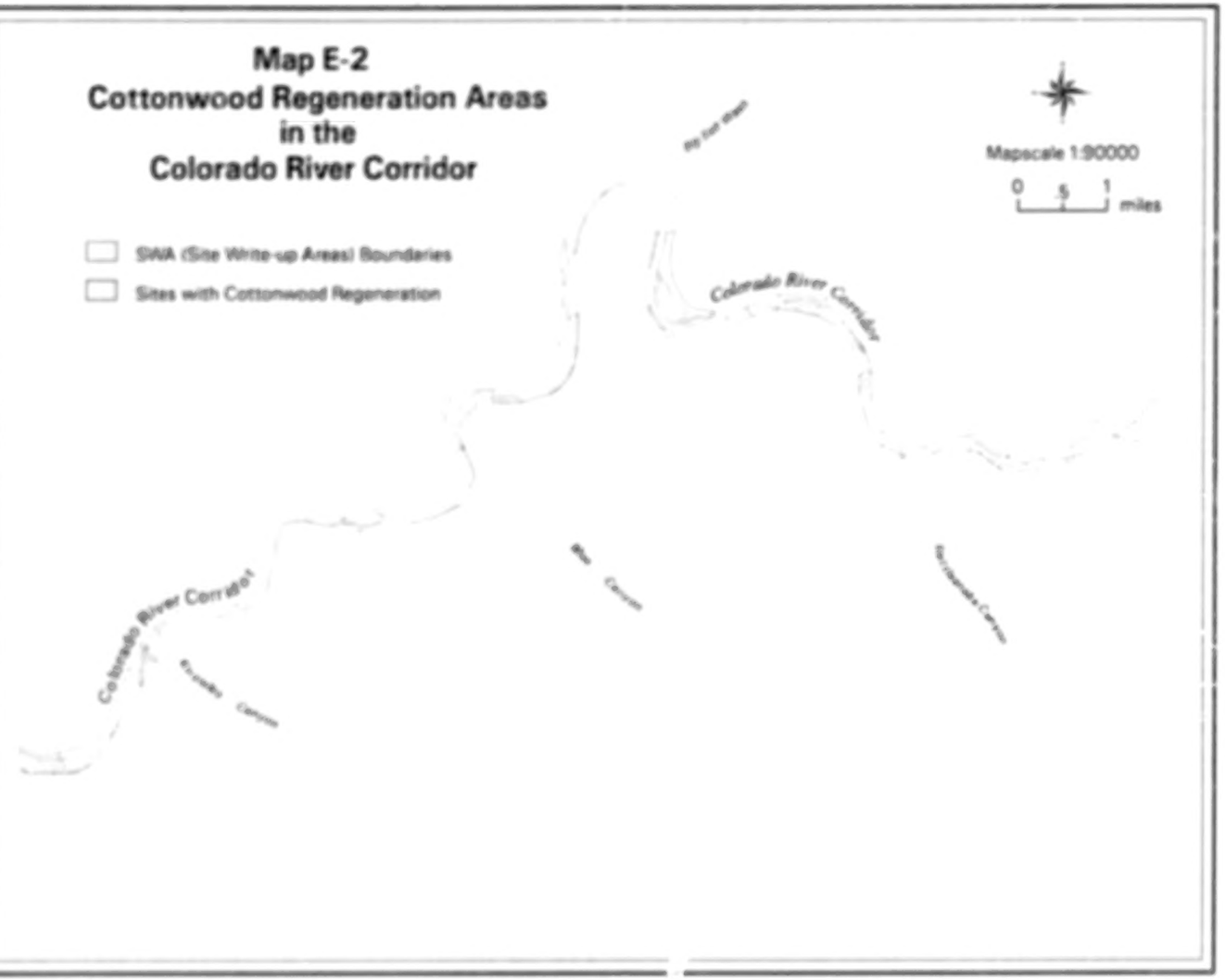
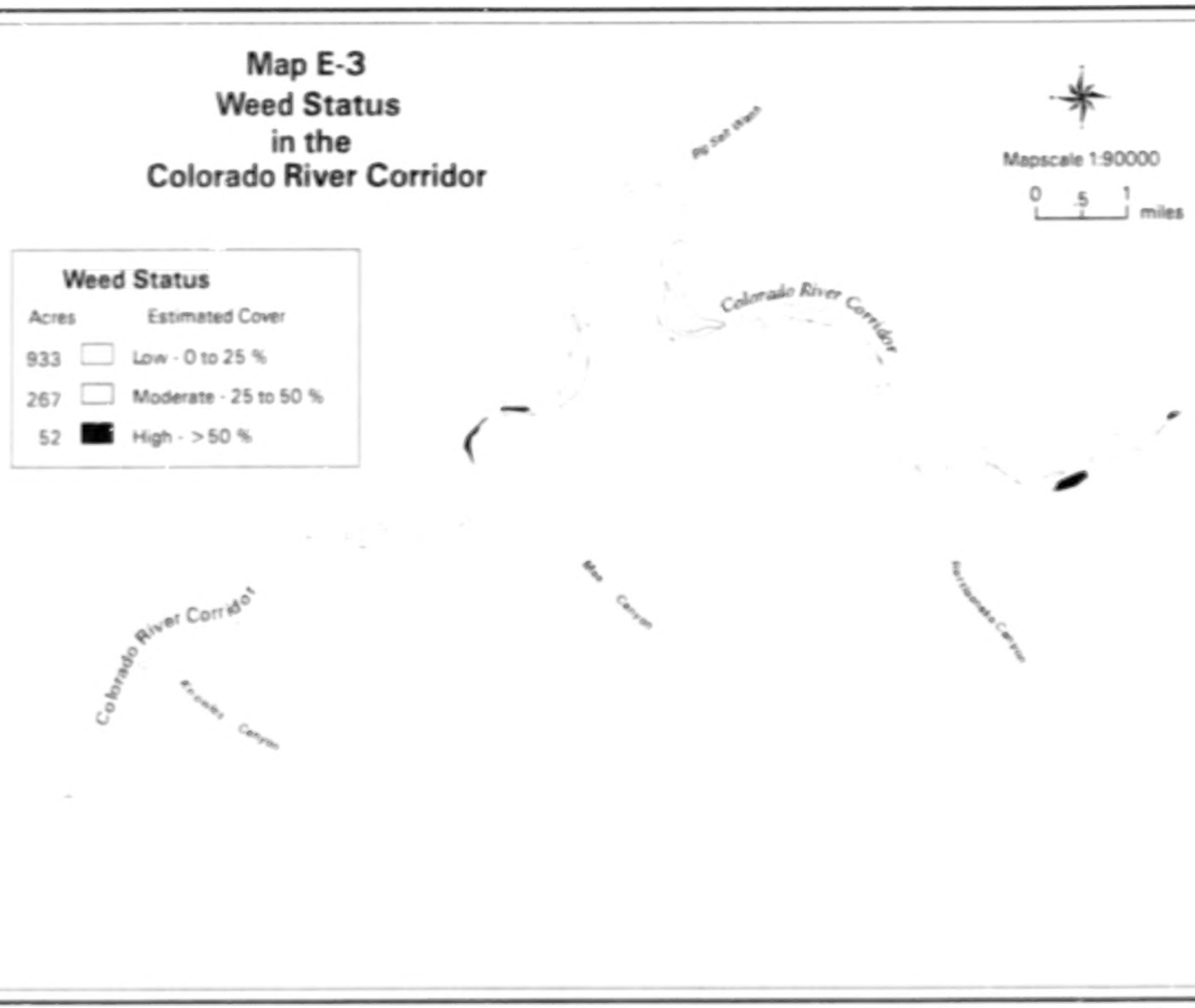
Colorado River Corridor

E-14

Map E-2
Cottonwood Regeneration Areas in the Colorado River Corridor



Map E-3
Weed Status
in the
Colorado River Corridor



Three primary DPC objectives were identified for the Colorado River based on these parameters.

Objective #1: The Colorado River corridor will be managed to provide a mosaic of healthy, diverse community types.

As such the existing reed/willow, willow/sedge, willow/cottonwood, skunkbush sumac/reedgrass, skunkbush sumac/willow community types will be maintained. The cottonwood/saltcedar, saltcedar/skunkbush sumac, cottonwood/Russian olive, saltcedar/Russian olive, salt cedar/willow communities will be tolerated due to the lack of an environmentally acceptable method to remove the saltcedar component. Management actions should be directed toward reducing saltcedar.

SWA s L7, L20, L22, R2, R19, R30 and R31 have unacceptable diversity due to complete dominance by exotic species such as cheatgrass or saltcedar. To the extent possible these areas will be managed to improve species composition of native species.

Objective #2: Reduce the current levels of exotic species or weeds where present.

Exotic species like tamarisk, Russian olive, and knapweed are presently a component of the Colorado River riparian community and pose a threat to diversity. Communities with a dominance of exotics are not acceptable.

SWA s L3, L7, L10, R8, R13, R17, R19, R21, R28 and R31 are areas with a dominance of exotics. These areas will be managed to reduce their current levels of exotics or weeds. Other vegetative communities with the presence of exotics will be managed to maintain or reduce their current level. In areas where exotics have not yet been established, every attempt should be made to prevent their introduction.

Objective #3: Preserve mature cottonwood stands and promote cottonwood regeneration.

The species and age class of most interest are mature cottonwoods. They are desirable because they offer special scenic qualities, provide shade for moderating water temperatures, shade for recreationists, are used by wildlife including the bald eagle and are given special consideration because of the difficulty in reproduction. Management for mature cottonwoods involves preserving potential recruitment areas, protecting existing stands of mixed-aged cottonwoods and management of exotic species.

Preserve mature cottonwoods in SWA s L1, L4, L11, L12, L15, L19, L20, L21, L22, L23, R1, R3, R4, R5, R6, R8, R14, R15, R17, R18, R23, R24, R25, R26, R34, R36, and R37.

Additionally, manage SWA's L1, L2, L3, L4, L5, L6, L7, L8, L9, L10, L11, L12, L14, L15, L16, L18, L19, L20, L21, L22, L23, L24, R1, R4, R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R17, R18, R21, R22, R25, R26, R34, R36, and R37 to promote existing cottonwood regeneration.

South of River

Overall the DPC team dealing with the zone south of the river felt the present vegetative communities were DPC. Given this, the task was to obtain a description that is acceptable and allows for some change. The two major areas of focus for this zone was: 1) acceptable compositions of pinyon and juniper trees and sagebrush, and 2) increasing cool season grasses and reducing cheatgrass.

Ecological Site: Semidesert Loam (UT) # 209

Vegetation Type	SWA #						DPC Composition (%)
	60						
	Current Species Composition (%)						
Trees	0						0
Shrubs	69						25 - 70
Forbs	2						2 - 10
W. Grasses	8						5 - 20
C. Grasses	0						5 - 10
Seral Stage	L						L

Notes
- Upper limit on sagebrush set at 800 lbs/acre. The higher sagebrush composition is acceptable due to the area being critical deer winter range.
- Decrease cheatgrass and increase cool season grasses.
- Prefer late seral stage

Ecological Sites: Semi-desert Loam (UT) #209 (*)
Deep Loam #292 (**)
Salt Desert Breaks #406 (***)

Vegetation Type	SWA #						DPC Composition (%)
	* 71	* 77 92 127 134	** 173	** 192	*** 121		
	Current Species Composition (%)						
Trees	0	0	23	0	0		0 - 25
Shrubs	65	80	54	76	61		5 - 70
Forbs	8	0	4	1	8		3 - 25
W Grasses	8	0	10	4	8		5 - 30
C. Grasses	11	19	8	20	11		5 - 40
Seral Stage	L	L	M	M	L		M or L

Notes:
- It is desirable that 85% of acres of these SWA's fall within the DPC description of mid or late seral stages. The remaining 15% could fall into other seral stages. This allows for diversity in seral stages.
- Other seral stages would be recognized by the extreme domination by one particular vegetation type (trees, shrubs, grasses, forbs).
- No trees were recorded in any of the transacts but some parks have a few trees. A few trees are acceptable.
- SWA's 77, 92, 127 and 134 currently have a composition of sagebrush outside the DPC upper limits.

Ecological Site: Rolling Loam # 298

Vegetation Type	SWA #						DPC Composition (%)
	57 113 117 125	185	179 246	183	188	193 260	
	Current Species Composition (%)						
Trees	0	3	0	0	33	42	0
Shrubs	49	19	61	59	42	39	20 - 60
Forbs	0	0	3	6	1	1	5 - 20
W. Grasses	3	0	6	10	0	0	1 - 20
C. Grasses	46	61	29	21	25	17	20 - 60
Seral Stage	--	--	--	--	--	--	

Ecological Site #298 (cont.)

Vegetation Type	SWA #						DPC Composition (%)
	212	217					
	Current Species Composition (%)						
Trees	0	16					0
Shrubs	63	48					20 - 60
Forbs	2	5					5 - 20
W. Grasses	6	3					1 - 20
C. Grasses	24	21					20 - 60
Seral Stage	M	M					M

Notes:
- Cool season grass component is crested wheatgrass.
- Unclassified seral stages is due to a large portion of these areas being comprised of crested wheatgrass, a seeded non-native.
- SWA's 212 and 217 represent a desired native community.
- Increase forb and warm season grass composition in most SWA's.
- Limit sagebrush production to 400 lbs/acre.
- Long term goal is to have native grasses replace the crested wheatgrass.

Ecological Site: Sandy Foothills #310

Vegetation Type	SWA #						DPC Composition (%)
	169	176 244	177	201	206	218	
	Current Species Composition (%)						
Trees	0	78	0	0	0	70	0 - 20
Shrubs	69	17	62	83	77	23	20 - 60
Forbs	13	1	0	6	0	0	5 - 15
W Grasses	0	0	5	0	0	0	2 - 20
C Grasses	2	3	30	0	4	3	5 - 50
Seral Stage	E	E	E	E	E	E	M or L

Notes

- Overall, prefer an increase in perennial grasses, moderate shrub composition and low tree composition.
- Prefer mid or late seral stage. Early seral stages indicates dominance of shrubs or trees.

Ecological Site: Semi-desert Loam #327

Vegetation Type	SWA #						DPC Composition (%)
	65	66 94 95 116 122	74 93	175	182	189	
	Current Species Composition (%)						
Trees	0	0	0	0	0	23	0 - 35
Shrubs	71	11	9	65	42	62	5 - 70
Forbs	1	27	16	1	0	4	3 - 20
W. Grasses	8	25	30	7	7	0	5 - 40
C. Grasses	15	14	9	21	44	10	5 - 40
Seral Stage	M	M	M	M	M	M	M or L

Vegetation Type	SWA #						DPC Composition (%)
	194	215	219				
	Current Species Composition (%)						
Trees	0	54	0				0 - 35
Shrubs	79	24	45				5 - 70
Forbs	2	1	0				3 - 20
W. Grasses	0	2	6				5 - 40
C. Grasses	20	15	50				5 - 40
Seral Stage	M	M	L				M or L

Notes:

- It is desirable that 85% of acres of these SWA's fall within the DPC description of mid or late seral stages. The remaining 15% could fall into other seral stages. This allows for diversity in seral stages.
- Other seral stages would be recognized by the extreme domination by one particular vegetation type (trees, shrubs, grasses, forbs).

Ecological Site: Semidesert Juniper #329

Vegetation Type	SWA #						DPC Composition (%)
	81	89	90	128	131		
	Current Species Composition (%)						
Trees	67	67	67	67	67		30 - 70
Black Sage	18	18	18	18	18		15 - 25
Shrubs	4	4	4	4	4		1 - 15
Forbs	6	6	6	6	6		5 - 10
W. Grasses	0	0	0	0	0		3 - 20
C. Grasses	4	4	4	4	4		3 - 20
Seral Stage	L	L	L	L	L		L

Notes:

- It is desirable that 80% of acres of these SWA's fall within the DPC description of mid or late seral stages. The remaining 20% could fall into other seral stages. This allows for diversity in seral stages.
- Other seral stages would be recognized by the extreme domination by one particular vegetation type (trees, shrubs, grasses, forbs).
- Overall prefer increase in warm and cool season grasses and decrease in trees.

Ecological Site: Loamy Saltdesert #401

Vegetation Type	SWA #						DPC Composition (%)
	63						
	Current Species Composition (%)						
Trees	0						0
Shrubs	26						10 - 35
Forbs	10						5 - 10
W. Grasses	4						10 - 60
C. Grasses	56						15 - 60
Seral Stage	L						L

Notes:
- Good diversity and balance between vegetation types.
- No one vegetation type should exceed 70% composition to maintain diversity.
- Prevent increase in annuals.

Ecological Site: Sandy Saltdesert #402

Vegetation Type	SWA #						DPC Composition (%)
	56	137	138 139	160	164		
	Current Species Composition (%)						
Trees	0	0	0	0	0		0
Shrubs	38	25	37	5	25		30 - 45
Forbs	0	8	3	18	8		2 - 15
W. Grasses	49	21	25	8	21		30 - 45
C. Grasses	5	9	10	17	9		5 - 20
Seral Stage	L	M	M	M	M		M or L

Notes:
- Good diversity and balance of vegetation types.
- Prefer mid or late seral stage for diversity.
- Encourage perennial grasses and decrease cheatgrass.

Ecological Site: Foothills Juniper: #447
Clayey Foothills #289(*)

Vegetation Type	SWA #						DPC Composition (%)
	61	64	68	73	75		
	Current Species Composition (%)						
Juniper	66	41	50	57	79		40 - 80
Pinyon Pine	0	5	6	13	10		0 - 10
Sagebrush	7	24	35	0	0		0 - 30
Other shrubs	13	16	1	9	1		1 - 15
W. Grasses	0	2	1	1	0		5 - 10
C. Grasses	4	8	5	13	2		5 - 15
Seral Stage	L	L	L	PNC	L		M, L, or PNC

Vegetation Type	SWA #						DPC Composition (%)
	76	78	79	187 234			
	Current Species Composition (%)						
Juniper	88	78	70	80			40 - 80
Pinyon Pine	0	4	9	0			0 - 10
Sagebrush	0	0	0	10			0 - 30
Other shrubs	0	2	10	1			1 - 15
W. Grasses	0	2	10	2			5 - 10
C. Grasses	5	5	9	7			5 - 15
Seral Stage	L	L	L	L			M, L or PNC

Notes:

- Mid to upper limit of sagebrush desirable in SWA's 64 and 68 for deer winter range.
- Prefer that 80% of acreage in these SWA's fall within the DPC description. The remaining 20% could fall into other seral stages. This allows for diversity in seral stages within this ecological site.
- Other seral stages would be recognized by extreme domination by one or two particular vegetation types (trees, shrubs, grasses, forbs or annuals).
- Maintain a high percentage of tree cover in the southern area of the planning unit including SWA's 116, 117, 180, 181, 188, 190, 192, 196, 197, 199, 219, 221, 222, 223, 226, 230, 234, and 247 to discourage movement of bighorn sheep to private land in Glade Park.
- Other SWA's within this ecological site that are not listed above are smaller areas. The preference is that these SWA's be in various seral stages but not necessarily in a particular one. This also allows for diversity of seral stages.

APPENDIX F

NATURAL IGNITION FIRE GUIDE SUMMARY

RUBY CANYON/BLACK RIDGE PRESCRIBED NATURAL IGNITION FIRE GUIDE

The Grand Junction Resource Area (GJRA) has developed a Prescribed Natural Ignition Fire (NIF) Guide for the southern portion of Ruby Canyon/Black Ridge (RCBR) planning area. This guide has been developed in response to the objectives identified in the Desired Plant Community section of the RCBR plan.

The RCBR is a wildland ecosystem which is inherently dynamic and constantly changing as a result of plant succession, insects, disease, drought, windstorm, wildland fire and human activities. While most of these natural processes have gone on relatively unchecked, wildland fires in and around the RCBR have been aggressively suppressed since the early 1950's.

Fire is beneficial and essential to wildlands, and that by suppressing all wildland fires, man has interfered with nature. Fire returns valuable nutrients to the soil, opens up closed canopies, allowing sunlight to reach the ground, stimulating new plant growth. The new plant growth provides habitat and forage for many insect and animal species.

Fire is an integral component of the natural dynamics of an ecosystem such as the RCBR. The affects of modifying fire's role in an ecosystem through man's interference can and may have adversely impacted the flora and fauna of the RCBR planning area. Fire is one of nature's predominate forces and for thousands of years fire has shaped the landscape on the Colorado Plateau, dictating the types of plants and animals that inhabit the area. It creates a mosaic of burned and unburned areas, promoting natural diversity in the landscape and increasing edge between cover and forage for wildlife.

The RCBR NIF guide has analyzed ways to allow fire to be restored to its natural ecological role in the planning area. This could be accomplished through allowing natural fires, generally those caused by lightning, to burn within certain prescribed parameters. Fires in locations that could potentially cause harm to private property or human life, or to other sensitive ecosystems would be suppressed. The initial analysis has considered the use of planned ignitions under certain limited circumstances to reestablish the natural pattern of wildland fires inside RCBR. In the future as fire plans are revised and updated the natural ignition fire program can be extended to other areas.

During the fire season, fire managers will monitor drought conditions to assess the potential for large and severe fires. In the decision-making process, rough indicators will be compared to benchmark years that represent both very dry and abnormally wet conditions. This information along with threats to life and property, forecasted weather

and fire behavior, resource availability to manage the NIF, and local and national fire situation, gives land managers indications of the potential risk of any prescribed natural ignition fire.

The BLM realizes the risks and possible impacts of allowing fires to burn naturally and run their course. Some of the short term effects of this action could be the temporary displacement of certain activities including; the general public engaging in recreational activities such as hunting, fishing; range permittees and special use permittees such as outfitters. Travelers in the area may also be affected by natural ignition fires and/or wildfires. Trails that pass through or close to the fire area may have to be closed.

Other possible impacts could be:

As natural ignition fires and wildfires burn during fire season, some communities may occasionally be impacted by smoke pooling in valleys. Nighttime inversions, particularly in the late fall, may hold smoke near the ground. However, an active NIF program should return ecosystems to a healthy condition and reduce long term smoke emissions.

Effects on the vegetation, soils, visual quality, water quality, wildlife and fisheries.

Scenic values will change after a prescribed natural fire passes through an area and the burn area recovers and sprouts new growth the following spring. Fire, however, can enhance scenic quality by providing diversity to the viewshed.

Some of these situations could require individuals, permittees and communities to cooperate or even make sacrifices for the long term benefits of making the RCBR a more natural and useable place for all. The BLM will work with any affected parties to try to alleviate any impacts or conflicts that could develop as a result of natural fires.

For more information on the RCBR NIF Guide contact the GJRA at (970) 244-3000.

APPENDIX G

ACQUIRED LANDS CONSIDERED FOR WILDERNESS

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APPENDIX G

ACQUIRED LANDS CONSIDERED FOR ADDITIONS TO BLACK RIDGE CANYONS WILDERNESS STUDY AREA

Acquired Lands -- Devils Canyon (640 acres), Flume Canyon (320 acres), Ruby Canyon East (130 acres), Ruby Canyon West (160 acres). Total acquired lands is 1,250 acres.

I. INTRODUCTION

The four parcels being reviewed for wilderness suitability are contiguous to the northern boundary of the Black Ridge Canyons WSA (19,595 acres recommended for wilderness in 1992). This WSA was analyzed in the November 1989 "Grand Junction Final Wilderness Environmental Impact Statement." They are located in Mesa County 10 miles west of Grand Junction, Colorado. Each area is bounded on three sides by public lands administered by BLM. The Devils Canyon parcel bounds private land on the north. Bureau of Reclamation withdrawn lands for the Horsethief State Wildlife Area form the northern boundary of Flume Canyon. The two acquired parcels in Ruby Canyon border a combination of public land and private lands along the Colorado River's edge.

Between 1992 and 1996, four parcels of private lands contiguous to the Black Ridge Canyons WSA were acquired by the BLM (see Maps G-1, page G-7, and G-2, page G-8). The parcels were inventoried for their wilderness potential as natural extensions of the contiguous WSA. Two of the parcels were determined to include lands that were unnatural in character. These parcels (Devils Canyon -- 440 acres and Flume Canyon -- 40 acres) will be dropped from further wilderness review as soon as the Ruby Canyon/Black Ridge Integrated Resource Plan is approved.

Although the contiguous Black Ridge Canyons WSA was studied under Section 603 of FLPMA and included in the Grand Junction Resource Management Plan and Environmental Impact Statement (1985), the review of these acquired parcels is being studied under Section 202 of FLPMA and included in the Ruby Canyon/Black Ridge Integrated Management Plan. This section of FLPMA directs BLM to prepare and maintain on a continuing basis an inventory of all public lands and their resources and values including wilderness. This wilderness inventory is summarized in this appendix.

In the study phase, BLM evaluates wilderness study areas based on a set of specific criteria which will be outlined in this appendix. Determining an area's suitability or nonsuitability for designation as wilderness means

determining whether the area is more suitable for wilderness preservation or more suitable for other uses.

II CRITERIA CONSIDERED IN DEVELOPING THE WILDERNESS RECOMMENDATION

Wilderness Characteristics

Naturalness

Four parcels (see Maps G-1 and G-2) were evaluated for their naturalness. The two Ruby Canyon parcels contiguous to the Black Ridge Canyons WSA are predominantly natural with negligible imprints of man. The northern two-thirds of the Devils Canyon parcel has been modified by man with several significant imprints that detract from its naturalness. It is in this area that the canyon opens into a broadly eroded bottom. The southern part of this parcel is more characteristic of Devils Canyon which cuts more than 600 feet into the northern, sloping edge of the Uncompahgre Plateau and is one of the most spectacular canyons in the Black Ridge Canyons WSA.

Over the wide mesa top to the northwest is Flume Canyon. Here, a bladed two-track has been constructed through the parcel for about one-forth mile which detracts from the naturalness of an open landscape. Bladed cuts of one to two feet are common along this section. The two-track continues with few cuts through flatter terrain. This southern part of the parcel is very natural in character and displays a well developed system of side canyons. Numerous natural features on each parcel adds to the natural setting.

The Ruby Canyon parcels form part of the shoreline of the Colorado River in Ruby Canyon. A small cabin is present on the western parcel but its impact on the overall naturalness is minimal and overall both parcels enhance the naturalness of the contiguous WSA. The small structure is used as a line cabin by the grazing permittee and this use is projected to continue.

Vegetation on the canyon floors is characterized by a combination of grassy meadows and sparse stands of pinyon-juniper woodland. Isolated stands of cottonwood trees and other riparian species such as willows, river birch and box elder can be found along the drainage and river shoreline. A well developed cottonwood stand is located in the Ruby Canyon West parcel. Flatter areas typically consist of big sagebrush with a scattering of grasses. The vegetative variety found on these four parcels compliment the vegetation types in the WSA which provide habitat for a variety of wildlife. Of special note are bald eagles who winter in the area and are present every day mid-December to mid-March in Ruby and Horsethief Canyons.

Peregrine falcons nest near the WSA and undoubtedly hunt the Ruby Canyon parcels. Cottonwood trees that grow along the Colorado River are an important part of the raptor habitat. Golden eagles and canyon tree frogs are sensitive species that are found in the area. The bird species, Scott's orioles, Gray vireo, and Cassins kingbird are also in the general area.

Solitude

The Black Ridge Canyons WSA provides outstanding opportunities for solitude. The large number of canyons and side canyons allow visitors to disperse throughout the WSA. Although the add on parcels by themselves do not possess outstanding opportunities for solitude because of their small size, they do enhance these opportunities in the contiguous WSA.

Primitive and Unconfined Primitive Recreation

The Black Ridge Canyons WSA provides outstanding opportunities for primitive and unconfined recreation in close proximity to the Grand Junction area (population 100,000 plus). The unit's outstanding scenery and landscape variety, its interesting geologic features, its four major canyons and its many resources provide numerous opportunities for hiking, sightseeing, float boating, horseback riding, hunting and many other activities. And all of these activities are enhanced by the parcels in Devils Canyon, Fiume Canyon and Ruby Canyon which are natural extensions of the WSA and share its outstanding opportunities.

Special Features

The WSA possesses outstanding geological, paleontological, archaeological and ecological and biological values. The four add-on parcels are considered to share these values.

Diversity in the National Wilderness Preservation System

Wilderness designation of the Black Ridge WSA and the four add-one parcels would add an outstanding representative of the juniper-pinyon woodland of the Colorado Plateau to the National Wilderness Preservation System but would not add a new ecosystem or landform. This ecosystem is currently represented by only one area in Colorado and 11 in the National Wilderness Preservation System.

Expanding the Opportunities for Solitude or Primitive within a days driving time (five hours) of major population centers

The add-on parcels as part of the Black Ridge Canyon WSA are within a five hour drive of three major population centers and within one hour of Grand Junction, the largest metropolitan area on the western slope of Colorado. These areas include Denver, Colorado and population centers of Salt Lake/Ogden and Provo/Orem in Utah.

Balancing the Geographic Distribution of Wilderness Area

The four add-on parcels as part of the WSA would contribute to balancing the geographic distribution of areas within the National Wilderness Preservation System. The nearest designated wilderness areas are about two hours from the Black Ridge Canyons WSA.

Manageability

The four add-on parcels as contiguous areas to Black Ridge Canyons WSA can be managed to maintain wilderness values.

Energy and Mineral Resource Values

The U.S. Geologic Survey prepared a mineral assessment of the Black Ridge Canyons WSA in 1988. This report's findings would generally also apply to the four add-on parcels. The area on the south side of the Colorado River in the WSA has a high resource/low development potential for placer gold deposits but is closed under a protective withdrawal. There are no oil and gas in the WSA. The development potential for oil and gas is low based on the lack of a stratigraphic section favorable for oil and gas occurrence.

Local Social and Economic Conditions

Wilderness designation of the Black Ridge Canyons WSA and the four add-on parcels would incrementally help to increase recreation use in the Grand Junction area. Greater public awareness of the WSA would draw wilderness users from outside west central Colorado. Wilderness use is projected to grow by 15 to 20 percent over 10 years. This increase would generate some increase in local income and, although not large, could be noticed in the Grand Junction area. The area has become very popular in the last 10 years and use will likely continue to increase.

III. Recommendation and Rationale

The Devils Canyon (200 acres) and Flume Canyons (280 acres) parcels provide key "jig saw puzzle pieces" in the canyons they help make up (see Maps G-1 and G-2). The Devils Canyon parcel, although small, helps to define a canyon ecosystem that had been segmented by private property. A similar situation was present in Flume Canyon where the entire lower canyon had been in private ownership blocking public use and enjoyment of the canyon ecosystem. The Ruby Canyon East and Ruby Canyon West acquired parcels now complete a distinct landform that is part of a large river meander that is a well known landmark in Ruby Canyon ("the big meander").

770 acres recommended suitable for wilderness (four parcels)

480 acres recommended nonsuitable for nonwilderness (two parcels)

It is recommended that 770 acres in four parcels be designated wilderness as contiguous parts and natural extensions of the Black Ridge Canyons WSA. The preferred alternative would be to designate the entire 770 acres as part of the 19,595 acre Black Ridge Canyons WSA.

The contiguous WSA was recommended for wilderness designation because of its size, naturalness, outstanding scenery and landscape variety, spectacular geologic features, cultural and paleontological values, ecological diversity and outstanding opportunities for solitude and primitive, unconfined recreation. Four major canyons and several side canyons, 13 rock arches and other geologic features, changing vegetation patterns and the shore of the Colorado River create a spectacular setting for the recreationist. The parcels at the lower ends of Devils and Flume Canyons enhance the above values including opportunities to experience outstanding opportunities for solitude and primitive and unconfined recreation. The Ruby Canyon parcels also add to the WSA's wilderness values including some valuable cottonwood groves along the Colorado River.

Wilderness designation of these four parcels would help complete long-term protection of two canyon systems and two shoreline areas along the river. Because of their small size, these parcels by themselves do not have outstanding opportunities for solitude and primitive and unconfined recreation. However, when considered with the contiguous WSA, these parcels are an extension of the Black Ridge Canyons WSA and therefore they share its outstanding opportunities. In the contiguous WSA, there are 18 miles of deep canyons that can be hiked. The two canyon parcels add an additional mile to this figure. Visitors will also have two new shoreline areas to enjoy.

Wilderness designation of these four parcels would help preserve valuable habitat for bighorn sheep, deer, mountain lion and bald and golden eagles. There are about 55 bighorn sheep in the WSA in 1997.

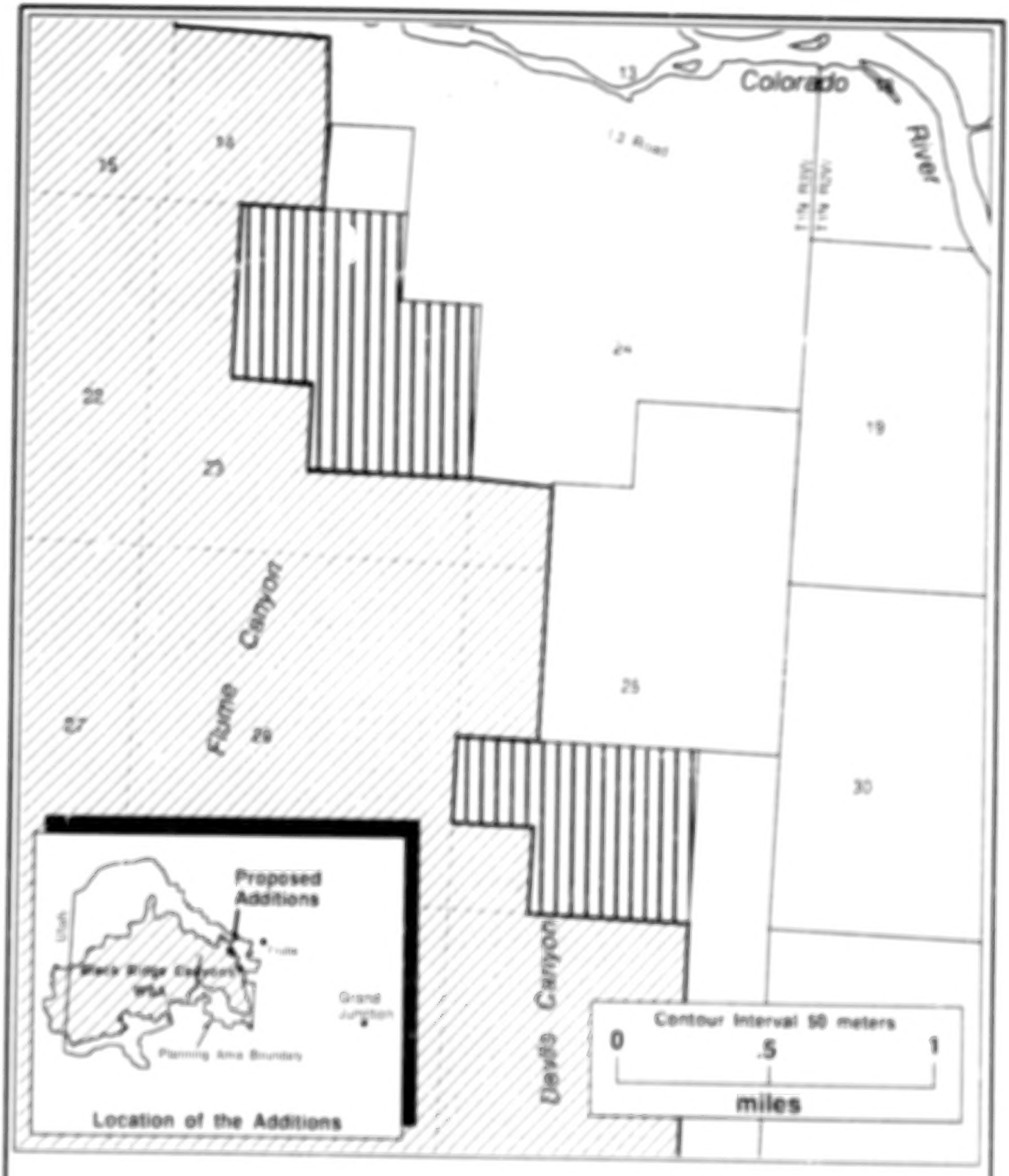
Two parcels of land in Devils Canyon (440 acres) and Flume Canyon (40 acres) are recommended for release for uses other than wilderness. The lower Devils Canyon parcel has been heavily impacted by roads, power lines, bridges, reservoirs, and major dirt work for building sites. Overall, 440 acres of the newly acquired 640 acres in Devils Canyon lack naturalness. The most northern, newly acquired 40 acre parcel in Flume Canyon has the major imprint of a constructed, bladed two-track way that is easily visible. One to two foot cuts are frequent along approximately one quarter-mile of steeper way in this area of the canyon.

No major manageability problems or resource conflicts would result from wilderness designation. Mountain bikes are using the Pollock Bench Trail in the WSA next to Flume Canyon while the WSA is under review by Congress. Mountain bikes have not been allowed to ride the two-track way in lower Flume Canyon because of the private property status until 1996. The Interim Management Policy for lands under wilderness review is to generally not allow mountain bikes in WSAs.

There are no mining claims within any of the four parcels. The BLM did acquire the mineral rights with all four parcels. The mineral development potential for the WSA is projected to be low because most of the area has a low mineral potential. Much of the shoreline including the Ruby Canyon parcels are considered to have high potential for placer deposits (U.S. Geological Survey 1988). These parcels have no claims and are within a protective withdrawal. There are no oil and gas leases in the areas recommended for wilderness. The USGS and BLM report that the area has a low development potential for oil and gas based on a lack of a stratigraphic section favorable for oil and gas occurrence.

All the parcels are open to leasing.

The Ruby Canyon parcels were previously owned by the grazing permittee in the Colorado Ridge allotment and will continue to be grazed as part of this allotment. The livestock operator uses motor vehicles approximately three times a year to conduct livestock operations. The Devils Canyon and Flume Canyon parcels are within the Three Canyon Allotment, which is currently not grazed (unallotted). Historically, sheep grazed in Devils and Flume Canyons.

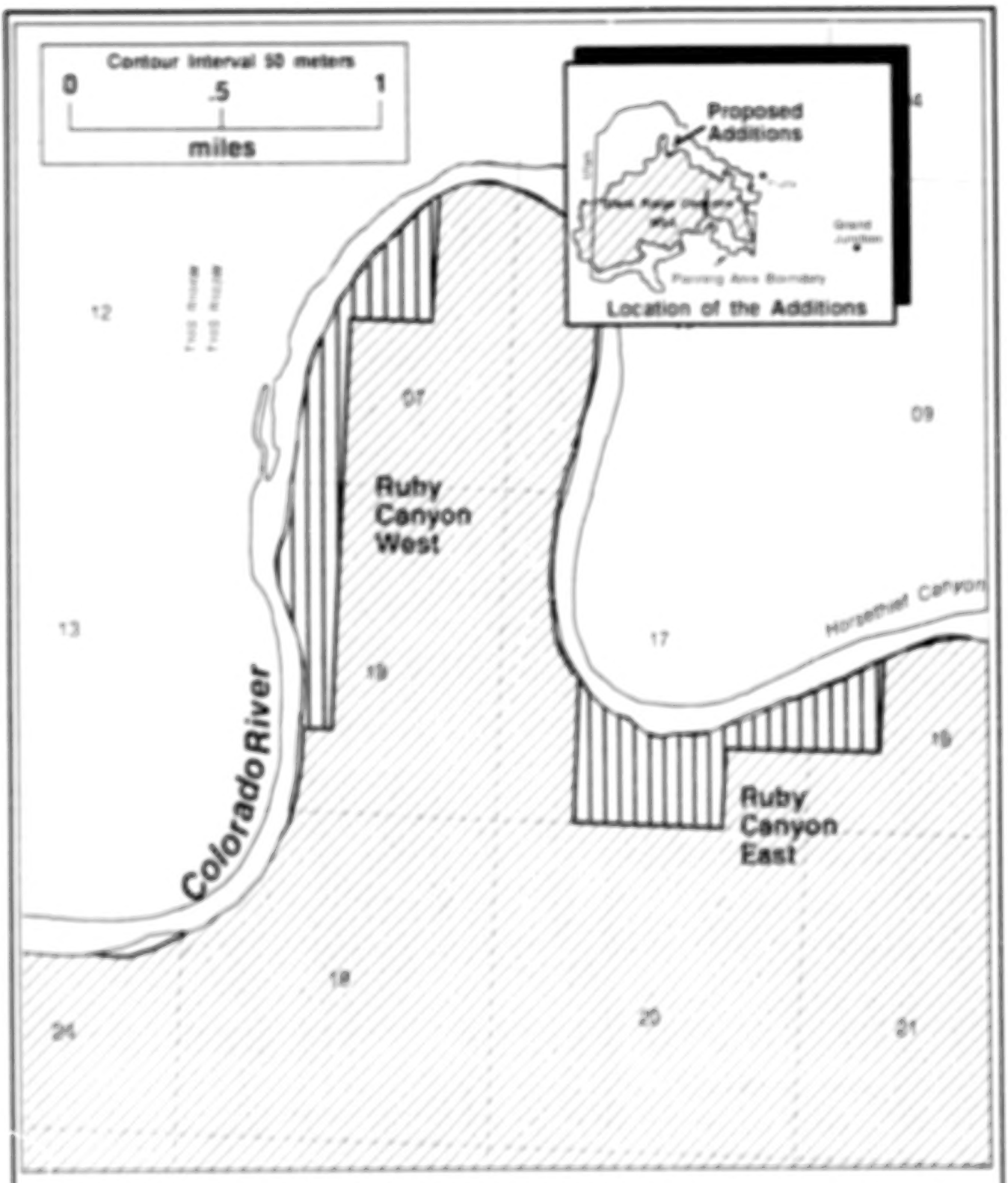


Map G-1. Proposed Additions to the Black Ridge Canyons WSA

Acquired Lands Not Suitable for Wilderness

Acquired Lands Suitable for Wilderness (1997)

Area Recommended for Wilderness 1991



Map G-2. Proposed Additions to the Black Ridge Canyons WSA

Acquired Lands Suitable for Wilderness (1997)

Area Recommended for Wilderness 1991

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Bureau of Land Management
Grand Junction Resource Area
2815 H Road
Grand Junction, CO 81506

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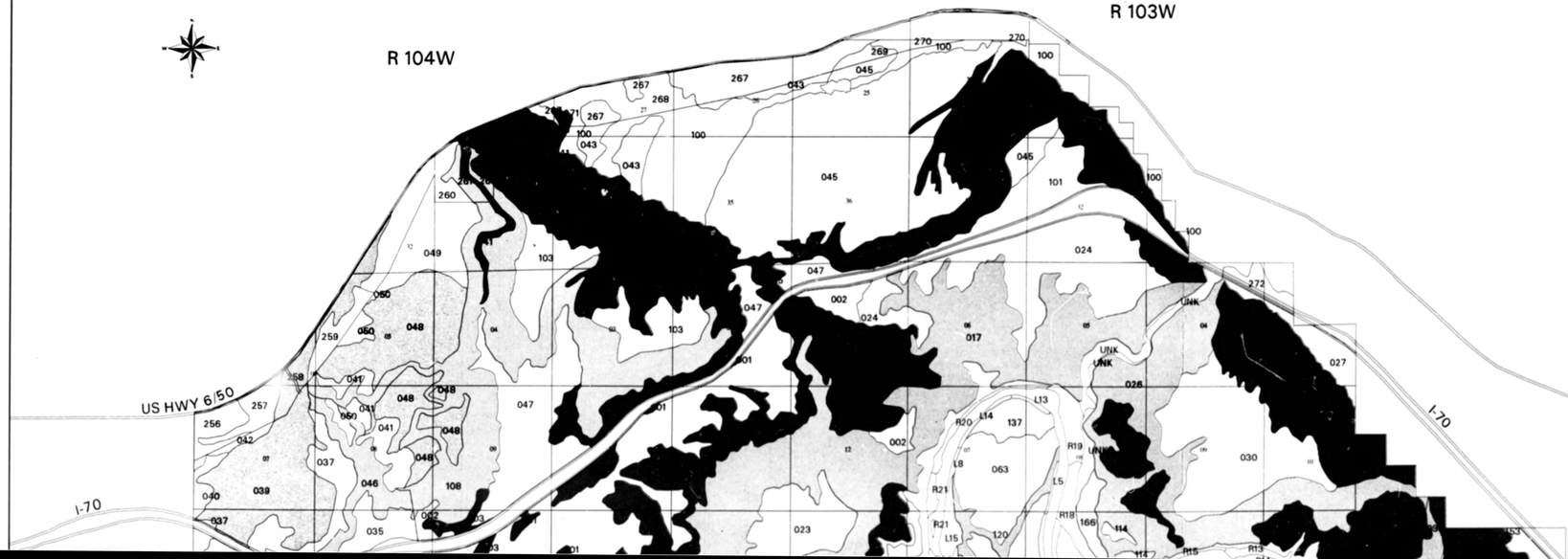
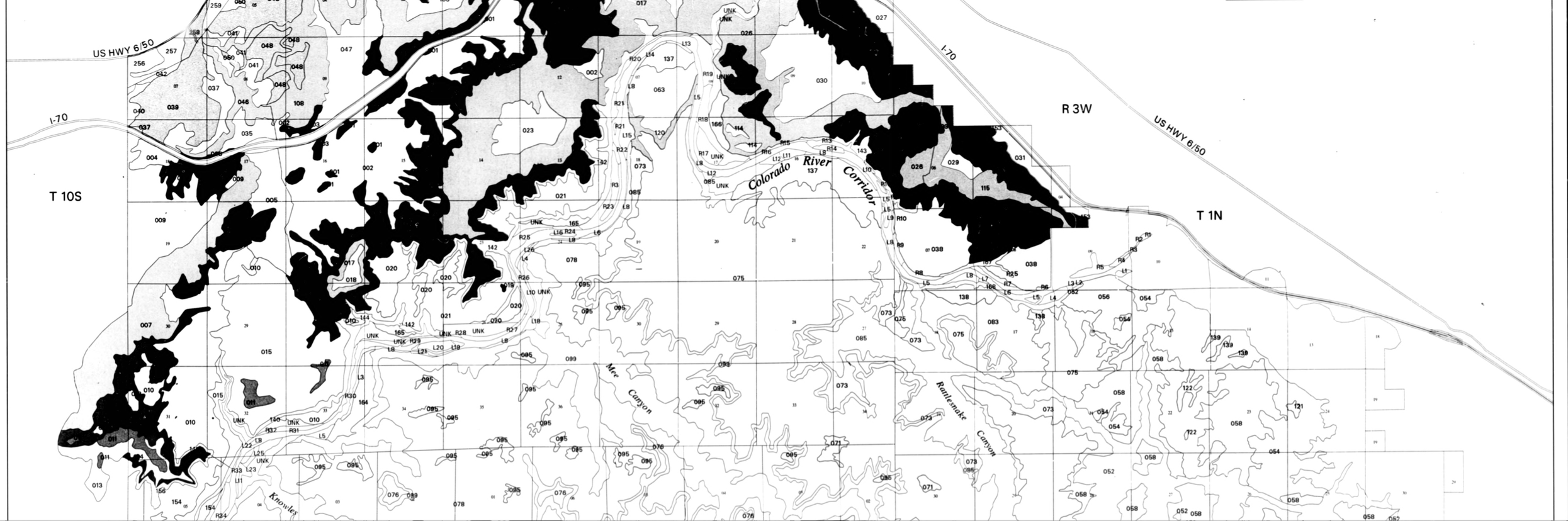


Ruby Canyon/Black Ridge Planning Area
Ecological Site Inventory (ESI)
Site Write-up Areas and Ecological Sites

Scale 1:50,000

0 1/4 1/2 1 miles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I-70
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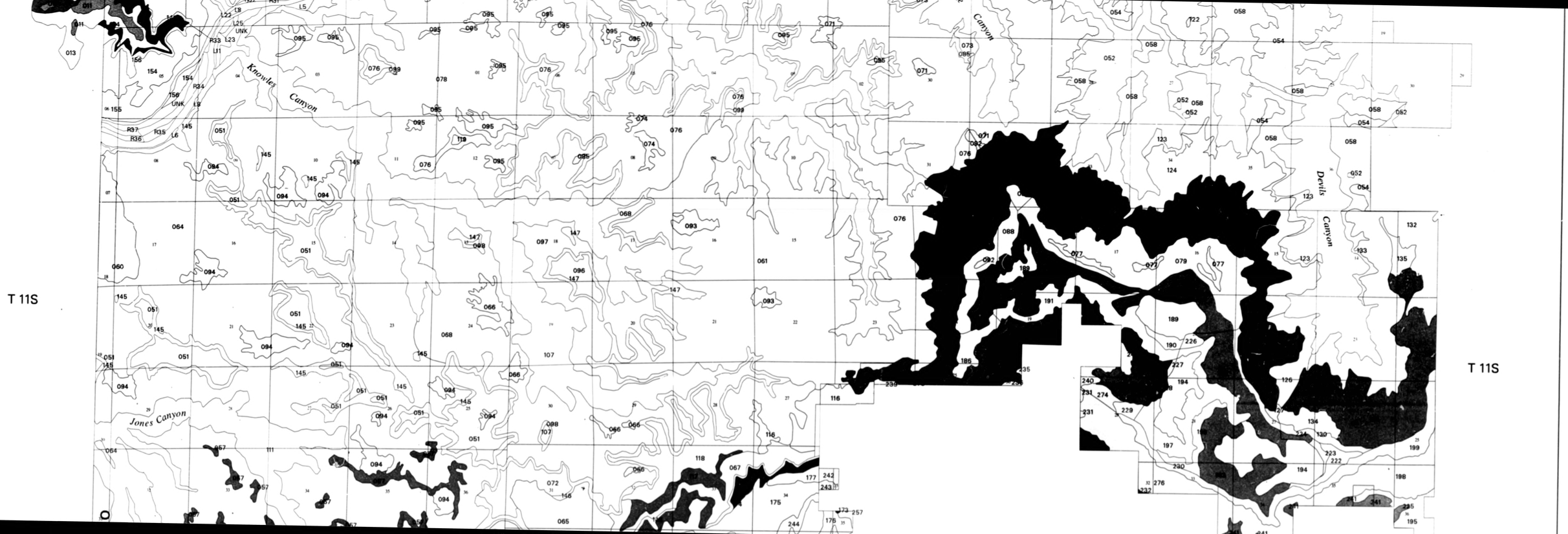
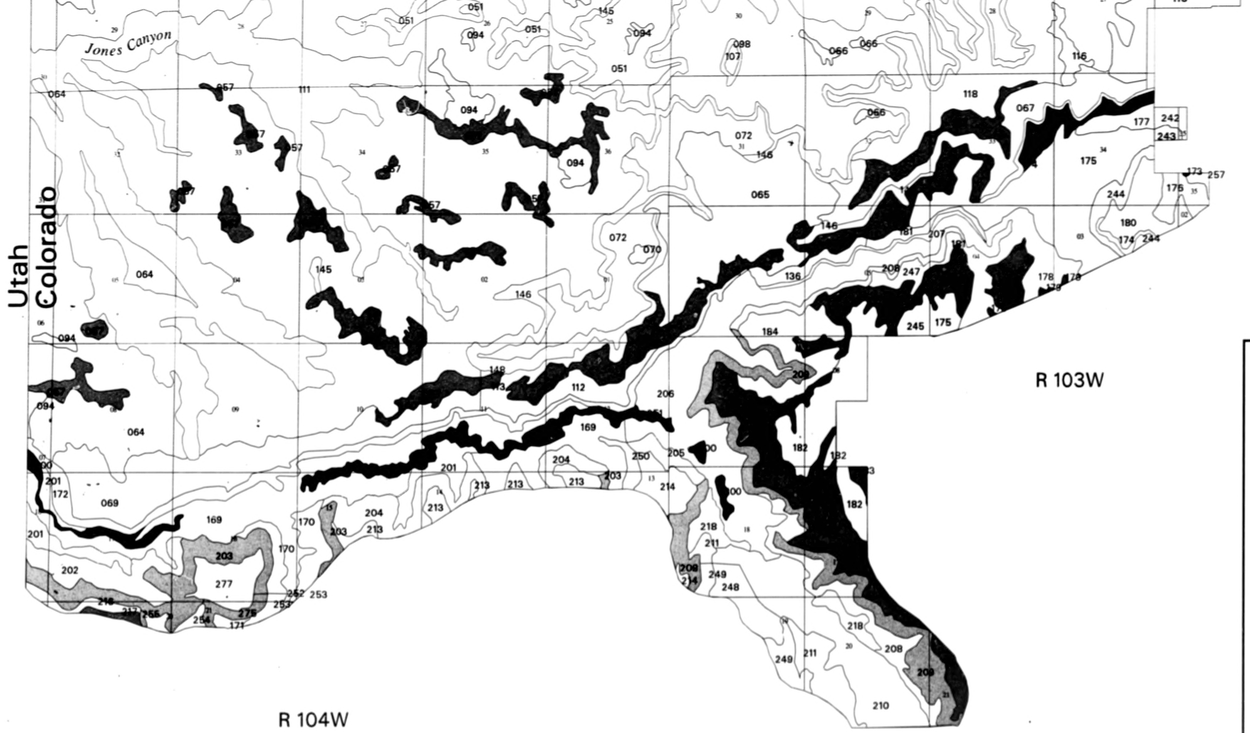
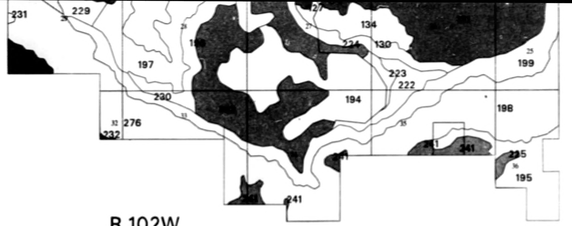
R 3W
T 1N
Colorado River Corridor
Mee Canyon
Rattlesnake Canyon
Knowles


T 11S
T 11S
Knowles Canyon
Jones Canyon
Devils Canyon





Ecological (Range) Sites

- CO285 Foothill Swale
- CO289 Clay Foothills
- CO292 Deep Loam
- CO297 Alkaline Slopes
- CO298 Rolling Loam
- CO310 Sandy Foothills
- CO325 Semidesert Loam
- CO326 Semidesert Sand Loam
- CO327 Semidesert Loam
- CO328 Semidesert Clay Loam
- CO329 Semidesert Juniper
- CO401 Loam Saltdesert
- CO402 Sandy Saltdesert
- CO404 Stony Saltdesert
- CO406 Saltdesert Breaks
- CO410 Silty Saltdesert
- CO447 Foothills Juniper
- UT209 Semidesert Loam
- Unclassified

SWA numbers prefaced by an L or R indicate Riparian Sites

Site Write-up Area (SWA) Boundary

073 SWA Number

Grand Junction Resource Area
Bureau of Land Management
June 1997